

APRIL 1958, Volume 70, Number 4

# PUBLIC HEALTH REPORTS

*In this issue*



U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
Public Health Service



**clean  
water**  
means  
Better Health



**WORLD HEALTH DAY**

**April 7, 1955**

*see overleaf*



# PUBLIC HEALTH REPORTS

Published since 1878

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An experience related by a Food and Agriculture Organization mission points up the World Health Day theme for 1955, "Clean Water Means Better Health." An FAO mission was advising the Pakistan Government on a project to control and use the water of the Ganges for agriculture. One day the head of the mission bought some fish from a fisherman in the river's delta—a man who lives on and from the water.

"For payment," said the fisherman, "just give us some fresh water to drink. That and a little rice are what we need."

Dr. M. G. Candau, Director-General of the World Health Organization, stated in his message:

"Abundant supplies of clean water have always been a necessary condition for the rise of the great civilizations of history, such as those nurtured in the valleys of the Nile, the Euphrates, the Indus, the Ganges, and the Yangtze. But as these civilizations flourished, their growing population only too often poisoned the water on which their life depended.

"Although spectacular results have been achieved within the last few decades in Western Europe and North America through the improvement of water supplies and the sanitary disposal of human wastes, no country in the world can yet afford to relax its vigilance.

"We must not forget that serious and widespread cholera and typhoid epidemics were still occurring in Europe and America at the end of the 19th century. As late as 1937, a momentary breakdown in the water purification system of Croydon, near Lon-

don, resulted in a terrible epidemic of typhoid fever.

"In the immediate years following World War II, 250,000 cases of typhoid fever with 25,000 deaths were occurring annually in Europe. In Mexico in 1948, an estimated 22 percent of all deaths were caused by waterborne diseases.

"Experts believe that in many Asian countries the sickness rate could be halved by protecting water supplies and providing proper facilities for the disposal of wastes.

"There is an added need for vigilance in areas where farming methods are being modernized, industries are expanding, and populations are becoming denser. Particularly careful planning is then needed to assure sufficient water supplies for homes, factories, irrigation, and electric power, and to solve the complementary problems of the disposal of sewage and industrial wastes."

## frontispiece . . .

Men of Loma de Ramas, a village of 400 inhabitants in El Salvador, transporting pipe for a water supply line. The river crossing was one leg of their trip from the supply depot at Guazapa to the village, over 5 miles of tortuous rock-strewn road and half-way up a mountain. To get fresh, drinkable water for the village, one phase of the WHO and El Salvador general health program, the men, women, and children of the village volunteered to carry the pipes and other equipment. (*United Nations photograph.*)

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### *Published concurrently with this issue:*

PUBLIC HEALTH MONOGRAPH NO. 27 . . . Roof rat population  
in southwest Georgia.

*Dean H. Ecke.*

18 pages; illustrations. A summary and information on availability appear on pages 413-414.



# PUBLIC HEALTH REPORTS



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*Arrest and cure of cervical cancer may be achieved in many cases by recognizing malignant cells before they become invasive. Described is the exfoliative cytology technique of screening patients for early and unsuspected uterine cancer.*

## Uterine Cancer Case Finding by Vaginal Cytology

—Memphis and Shelby County, Tennessee—

By JOHN E. DUNN, JR., M.D., M.P.H., and DOUGLAS H. SPRUNT, M.D.

**E**XFOLIATIVE CYTOLOGY as a technique for recognizing cancer cells shed or abraded from epithelial surfaces has greatly facilitated the recognition of carcinomata before they become invasive, particularly carcinoma of the uterine cervix. Such a carcinoma is not apparent by its mass or by its surface, and on visual inspection, it is not distinguishable from normal or benignly altered epithelium. Discovery, therefore, at this stage is largely dependent on recognizing suspicious cells sampled from epithelial surfaces. Blind sampling of larger surfaces can be accomplished more efficiently by smear than by biopsy, although this fact has no bearing on the relative merits of the two procedures for establishing a final diagnosis.

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The cytological technique in finding cases of cervical carcinoma presents some practical difficulties, but these are not insurmountable. In Memphis and Shelby County, Tenn., an area with a population of about 165,000 adult females, a uterine cancer case-finding study was begun in August 1952 to be continued for a 3-year period, or until all women who are participating have had an opportunity to have three successive examinations at yearly intervals.

One of the objectives of the study is to determine age-specific incidence and prevalence rates for carcinoma in situ and for presymptomatic carcinoma of the cervix. Because carcinoma in situ of the cervix is frequently present in younger women, all females aged 20 years and over are offered the opportunity for cytological examination.

Although the original technique for cytological examination was based on examination of the exfoliated cells in vaginal pool specimens (1), most cytology laboratories find it expedient to examine a specimen taken directly from the cervix only or a cervical specimen in conjunction with the vaginal pool specimen. In this study, vaginal pool specimens are used exclusively in initial screening, since they can be taken by personnel who are not physicians.

### Organization of the Study

Specific plans for implementing the project were developed after the Memphis and Shelby County Medical Society had endorsed preliminary plans. The cytology laboratory is equipped and staffed by the National Cancer Institute of the Public Health Service. The division of pathology and bacteriology of the University of Tennessee furnishes space, supervises the operation of the project, and examines biopsy specimens from indigent patients. With the cooperation of the other pathologists in this region, this division sees all other biopsies recommended because of cytology findings.

A policymaking committee composed of the organizations participating and cooperating in the study includes representatives of the divisions of pathology and bacteriology and of obstetrics and gynecology of the University of Tennessee, the Memphis and Shelby County Health Department, the Shelby County Medical Society, the Bluff City Medical Society of Negro Physicians, the Shelby County Unit of the American Cancer Society, and the Public Health Service. The general plan of the study was approved by this committee, and in July 1951 preparations were begun to put the project into operation. A year was allowed for establishment of the cytology laboratory and the training of personnel.

### Cytology Laboratory

Staffing the cytology laboratory and training technicians to handle the anticipated volume of 400 cytology specimens a day was the first step in organizing the project.

The laboratory staff is composed of a pathologist, a chief technician, 3 secondary screeners, and 12 primary screeners. The primary screeners work in groups of 4 under a secondary screener, who is responsible for supervising and checking their work. The 3 secondary screeners are supervised and their work is checked by the chief technician. Final review and interpretation of suspicious and positive slides are the responsibility of the pathologist.

One additional technician examines all cervical specimens when these are requested as repeat examinations. We believe that this is

important, since a smear from the cervix has so many more cells than a smear from the vaginal pool that a technician shifting from the examination of one type of specimen to the examination of the other is likely to become inefficient in both procedures.

Training of the staff was begun in July 1951. Three technicians who had had experience in cytology screening in a Public Health Service laboratory and one technician who had had training in the division of pathology and bacteriology of the University of Tennessee formed the nucleus of the staff. A physician with some training in pathology and with experience in cytology was also available for training and eventual supervision of the cytology laboratory.

Because additional technicians were not available, recent college graduates were interviewed, and 12 were selected as trainees. After a period of preliminary training, three of the best qualified technicians were sent to the cytology laboratory of the Vincent Memorial Hospital in Boston for additional training for supervisory positions. This laboratory uses vaginal pool specimens exclusively.

The cytology laboratory supplies the physicians of the community with materials for taking specimens from their private patients, collects the specimens periodically, and replenishes supplies of materials.

The amount of information which physicians are requested to submit to the laboratory with specimens is kept to a minimum: name, age, race, and home address; age at marriage; pregnancy history—age at first and at last pregnancy, number of pregnancies, and date of last menses; history of vaginal bleeding; history of surgery or radiation therapy in the pelvis; and name and address of physician or clinic submitting the specimen.

Since the cytology examination serves as a screening procedure, the laboratory report to the physician or clinic either indicates that the findings are negative or recommends further study—additional cytology specimens or biopsy, depending on the judgment of the pathologist—without specifying a provisional diagnosis. Because the initial cytology examination is made on a single vaginal pool specimen, slides containing abnormal but not definitely suspicious cells warrant, in addition to a second vagi-

nal pool specimen, a repeat examination with a specimen taken directly from the cervix.

A negative report is accompanied by a stamped postal card addressed to the patient, informing her that the results of her test are negative and urging her to repeat the examination in a year. The private or clinic physician signs the card and mails it to the patient.

### **Record Unit**

The record unit of the laboratory keeps a record of all women for whom cytology specimens are examined, the results of this examination, and a record of tissue examinations up to the point of final diagnosis. Space is provided on the back of the record card for recording the cytology findings and the report of biopsy when this is recommended and completed.

The unit is staffed with a supervising clerk, 2 record clerks, and 1 coding clerk, who codes the recorded material for preparation of punch-cards to be used in the mechanical tabulation of data for analysis. The coding clerk also assists with routine recordkeeping when necessary.

The record unit keeps a tickler file of all patients for whom additional diagnostic study has been recommended. If the initial examination indicates a need for additional cytology specimens, the arrival of such specimens in the laboratory indicates that followup has been successful. If no specimens are received, further followup is carried out.

### **Followup**

The physician is responsible for contacting private patients for whom the cytology report indicates the need for further study. Two weeks after the report is sent to the physician, the cytology laboratory makes a telephone inquiry to him concerning the patient's response. If a biopsy has been taken, the name of the pathologist who examined the specimen is noted, and his findings are recorded on the patient's card in the record unit. If a biopsy has not been taken, the laboratory contacts the physician's office periodically until the patient returns for further study and a report of the

results of examination is available. For both private and clinic patients, if cancer is found the case is closed as far as the cytology laboratory is concerned. Therapy becomes the responsibility of the private physician or the gynecology clinic.

The followup services of public health nurses are available to private physicians, although most physicians prefer to assume this responsibility themselves.

Clinic patients for whom further study has been recommended are followed up by the division of public health nursing of the Memphis and Shelby County Health Department. The cytology laboratory sends referral slips to the health department to be given to the general public health nurse who serves the area in which the patient lives. The nurse contacts the patient personally and makes clinic appointments for further examination.

The health department nurse responsible for supervising cytology referrals periodically checks with the record unit of the cytology laboratory to determine which patients are not responding to followup, and when necessary, she sees that additional visits are made by a general public health nurse. If repeated followup visits are unsuccessful, the supervising nurse makes a home visit in a final effort to persuade the patient to come in for further diagnostic study.

### **Clinics for Indigents**

After the vaginal cytology study was organized, all adult female patients at the clinic for indigents in the Gailor Out-Patient Clinic of the City of Memphis Hospitals and the women who accompanied them to the clinic were informed that cytology examinations were available in the clinic newly established for that purpose. The large attendance, chiefly Negroes, and the response of the patient to the cytology service made this clinic a very productive source of material for study. Since the gynecology clinic is held in the same building as this cytology clinic for indigents, the latter has become the central clinic for indigent patients who come for repeat smears and for referral for further study.

In the clinic for indigents, vaginal pool speci-



mens are used exclusively. A trained nurse, who has had considerable experience in cancer clinics and several years' experience in taking specimens for a cytology laboratory, supervises the personnel who take the specimens.

In the interest of economy and efficiency, non-professional personnel take the specimens. They are supervised directly by the nurse in charge until she is satisfied that they are capable of working under general supervision. These employees also clean and sterilize vaginal pipettes and see that the kits furnished to physicians are equipped with slides, pipettes, and record forms.

These personnel were recruited through local employment sources from a group of intelligent but untrained young women. They were given some background information on genital anatomy and the symptoms of uterine cancer and instruction in the method of obtaining information for the record form, handling of patients, and the technique of obtaining a vaginal smear.

Two senior members of the resident staff of the division of obstetrics and gynecology are responsible for the clinical study of indigent patients with suspicious and positive cytological findings. All patients in this category are seen by these two physicians and are kept under their observation until tissue studies have been completed and a final diagnosis has been established. Patients who have cancer are hospitalized for treatment by the staff of the division. All tissue examinations of these patients are made in the division of pathology and bacteriology of the University of Tennessee. For uniformity of tissue interpretation in connection with the study aspects of the project, other pathologists of the area who examine biopsies from patients found to have suspicious cytology as a result of the project have cooperated by allowing these biopsies to be reviewed.

As the technicians taking specimens became sufficiently experienced, cytology clinics were opened in two other locations in the city where facilities for indigent patients are available. These are largely prenatal and well-baby clinics, and most of the patients are Negroes. The hope was that the publicity given the program would attract well women to the clinics, as well as women attending the other clinics operated in these facilities, but the response has been dis-

appointing. The cytology examinations are largely made on the regular clinic patients and on the relatives and friends who accompany them to the clinic.

### **Other Cytology Clinics**

Parent-teacher organizations were informed about the project through publicity in the newspapers, over the radio, and through talks given at their regular meetings. Offers were made to open clinics in school buildings at hours which would be convenient for the women interested. A number of clinics were opened on this basis and attendance has been excellent.

In these clinics, each patient is asked for the name of her family physician, and the report of cytology findings is sent to him. If the patient has no physician, she is referred to the Memphis and Shelby County Medical Society for a list of recommended physicians. The results of the examinations are reported to the physician she chooses; no report is ever made directly to the patient.

Industrial organizations are another source of cytology specimens from well women. The management of a number of industries was informed of the nature and purposes of the project, and an offer was made to conduct cytology clinics for female employees. The response to this offer has been gratifying, and many industrial organizations in the study area have had the benefit of this service.

The usual plan for industrial organizations is to have two clinic sessions about 2 weeks apart. At the second session, patients whose examinations were unsatisfactory are reexamined, and women who were menstruating when the first clinic was held have an opportunity to take advantage of the service. Reports are sent to the family physician or to the plant physician, never to the patient.

### **Publicity**

The mechanics of the cancer case-finding project makes public acceptance and cooperation crucial to its success. The project was initiated with a minimum of general publicity by newspapers and radio, for, with no previous experience in cancer case finding to draw upon,



there was no way of anticipating what the public's response would be. A widespread general response by the 165,000 women in the area who were eligible for the examination would swamp the available facilities. Therefore, it was necessary to work for an even flow of patients on a long-term, continuing basis. Also, to test the flow, processing, and reporting of specimens and reports, a "shakedown" period was considered necessary.

It soon became evident that the public was not overly conscious of cancer as a personal problem, and that more aggressive educational measures were needed. Yet it was necessary that publicity should not antagonize practicing physicians since their cooperation is a necessary part of the project.

The chairman of the policy committee is responsible for the supervision and direction of publicity. Facilities of the university are used to carry on the publicity, and regular announcements and descriptions of the project in local newspapers and on the radio are supplemented by donated space in store windows, billboards, advertising on buses, and pamphlets. Soon after the project began, an exhibit was presented at the local fair. Opportunities are sought to discuss the project before women's organizations and parent-teacher and church groups.

In the beginning, the publicity staff consisted of one full-time person, who devoted most of her time to working with Negro groups. Negro women are less inclined than white women to obtain the cytology examination voluntarily, although they are quite willing to have the examination when they are attending a clinic for another purpose. Added to the staff a few months later was a second person, who had gained considerable experience in public relations in the health field as a result of working with voluntary organizations.

Any apprehension about the public's over-consciousness of cancer has been completely dispelled. Enlightenment and motivation have become the leitmotifs of the publicity program in the effort to reach women individually through every possible medium, until they accept the fact that they can have cervical cancer, and that the cytology examination is a means of detecting this cancer in a curable stage.

## Discussion

Progress of the study of vaginal cytology as a means of finding cases of uterine cancer has been very satisfactory. Only occasionally have the laboratory facilities been taxed to capacity. However, it is doubtful whether the laboratory as presently staffed could maintain the pace required by the original estimate of a maximum of 400 smears a day. Each primary screener can process 25 to 30 slides daily, a laboratory total of about 300, but personnel turnover, need to recruit and train new technicians, illness, and vacations make this potential difficult to meet. Nevertheless, the cytology laboratory has been able to provide the service demanded of it.

A preliminary report on the results of the study has been published elsewhere (2). It is sufficient to say that, in general, in the first 30,000 women examined, 90 percent of the smears have been negative; 6 percent have been unsatisfactory and a repeat examination has been requested; and 4 percent have been recommended for further study. Of these 4 percent, a little less than half have been recommended for biopsy after initial or repeat cytology study. Epithelial changes warranting a diagnosis of carcinoma in situ or invasive carcinoma of the cervix have been found in about half of the biopsy specimens.

Since vaginal smears are used exclusively for initial screening, records of cases of cervical cancer in the Memphis hospitals are checked against the records of the cytology clinic to determine whether these cases were missed by cytology examination. A few such cases have been observed. As a further check, the morbidity survey conducted prior to the beginning of the project is to be repeated (3) and known cases of cervical cancer will be checked against the cytology file to identify additional missed cases.

In a few instances, skeptics have put the cytology program to the test by submitting specimens from known or clinically obvious cases. There are no known instances in which the cytology examination has failed under these circumstances.

As stated earlier, repeat smears from the cervix as well as from the vaginal pool are requested when the original pool specimen cannot be classified as negative. The smear from the

cervix is examined by the technician trained in the examination of cervical specimens, and the new vaginal pool smear is studied by another technician. Each technician makes a report to the chief technician, who studies both report and slides and makes a final evaluation for the review of the pathologist in charge of the laboratory. In this project, cytology is used for screening; it is not competing with the tissue study for relative accuracy in final diagnosis.

Pelvic examinations are not an essential feature of the project. Private physicians use their own discretion in this matter. Indigent patients are not given pelvic examinations but are queried as to symptoms suggestive of cancer. If they have any questionable complaint, they are urged to go to the gynecology clinic without waiting for the report of the cytology findings. If smears contain unexplained microscopic blood, the patient is referred to the gynecology clinic for examination, regardless of the cytological evidence.

Because of staffing and other requirements, it is not feasible at this time to determine minimum costs per examination in this study, but we feel that the cost of cytology examination is not prohibitive when it is compared with the cost of other laboratory procedures. Cost estimates of cytology examination in other studies have ranged from 90 cents (4) to \$3.00 per smear (5), but it is difficult to determine what fixed costs, such as rent, are included in these figures.

Final judgment of the value of vaginal cytology will depend on the following considerations:

1. Can the periodic use of such a simple procedure as vaginal cytology in a population of women result in the diagnosis of cervical cancer sufficiently early so that it will become predominantly a curable disease?

2. Can the interval between examinations be safely extended to more than a year?

3. Will the public accept the cost of finding cancer in a curable stage by this method as a

substitute for prolonged treatment that is often only palliative and all too frequently hopeless?

### Summary

A 3-year cytology screening program for cervical cancer in a general female population was organized in Memphis and Shelby County, Tenn., in 1951 and was put into operation in 1952.

The goals of the study are:

1. To determine whether periodic vaginal exfoliative cytology as a screening procedure can be used to diagnose cancer in the preinvasive stage.

2. To accumulate data for determining age-specific incidence and prevalence rates for both preinvasive and invasive cervical cancer.

3. To estimate the frequency with which vaginal cytology needs to be applied to be effective as a case-finding procedure.

4. To determine whether, through this case-finding procedure, cervical cancer can become largely a curable disease.

### REFERENCES

- (1) Papanicolaou, G. N., and Traut, H. F.: Diagnosis of uterine cancer by the vaginal smear. New York, The Commonwealth Fund, 1943.
- (2) Erickson, C. C., Everett, B. E., Siegler, E. E., Whitacre, F., Stirling, J., Dunn, J. E., Graves, L. M., and Sprunt, D. H.: Preliminary report of 20,000 women studied by the vaginal smear technic in a general population. *Proc. Am. Assoc. Cancer Research* 1: 14 (1953).
- (3) Dunn, J. E., Rowan, J. C., Erickson, C. C., and Siegler, E. E.: Uterine cancer morbidity data, Memphis and Shelby County, Tenn., 1950-51. *Pub. Health Rep.* 69: 269-274 (1954).
- (4) Cuyler, W. K., Kaufmann, L. A., Carter, B., Rose, R. A., Thomas, W. L., and Palumbo, L.: Genital cytology in obstetric and gynecologic patients. A four-year study. *Am. J. Obst. & Gynec.* 62: 262-278 (1951).
- (5) Lombard, H. L., Middleton, M., Warren, S., and Gates, O.: Use of the vaginal smear as a screening test. *New England J. Med.* 246: 523-528 (1952).

# National Marriage and Divorce Statistics

—Progress Report, 1945–1955—

By HUGH CARTER, Ph.D.

WITH the increased emphasis on the family, as well as the individual, as a basic unit around which to plan public health activities, the need for statistics on family formation and family dissolution is generally recognized. The consequent increase in the demand for statistics on marriages and divorces has stimulated the development of registration systems, particularly within the last decade.

In general, State departments of health collect, process, and publish the vital statistics of individual States. Location of the State files or indexes of marriages and divorces in the vital statistics offices places the job of handling these records in the hands of persons already skilled in the management of vital records and saves the added overhead costs that would be incurred by establishing separate offices.

## Increase in States With Central Files

The number of areas that maintain central files of marriage and divorce records has steadily increased. This is important since areas that do not maintain such files are not in a position to provide comprehensive statistics. In 1945, 34 areas maintained central files of

marriage records. By the end of 1954, 40 areas—36 States, 3 Territories, and 1 independent city—maintained central files (fig. 1). Divorce records were centrally filed in 23 areas in 1945. At the end of 1954, these records were centrally filed in 34 areas—30 States, 3 Territories, and 1 independent registration area (fig. 2).

In areas with no central files, it is possible to obtain certain data, but these are limited in scope and often incomplete in coverage.

## Standardizing Report Forms

Since 1945, great progress has been made toward standardizing the items of information to be obtained on marriage and divorce report forms. In 1954, the standard record of marriage and the standard record of divorce or annulment prepared by the Public Health Service were formally endorsed by the Public Health Conference on Records and Statistics, a cooperative organization made up of official representatives of the vital registration and public health statistical activities of each State, Territory, and independent registration area. A long period of discussion had preceded this action by conference members (1). The conference also recommended a list of optional items for inclusion on the State report forms to provide data for more intensive study of marriages and divorces.

Although some users of marriage and divorce

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*Dr. Carter is chief of the Marriage and Divorce Statistics Section, National Office of Vital Statistics, Public Health Service.*

---

**1949**  
ALASKA

WASH.  
OREG.  
CALIF.  
NEV.  
IDAH. 1947  
MONT.  
WYO.  
UTAH 1953  
NEBR.  
S. DAK.  
N. DAK. 1949  
MINN.  
IOWA  
WIS.  
ILL.  
IND.  
OHIO 1949  
PA.  
N.Y.  
CONN. 1947  
MASS.  
Vt.  
N.H.  
ME.

COLO.  
KANS. 1951  
ARIZ.  
N. MEX.  
TEX.  
OKLA.  
ARK.  
TENN. 1945  
MISS.  
ALA.  
GA. 1952  
S.C.  
N.C.  
VA.  
W. VA.  
DEL. MD.  
N.J.  
N.Y. CITY  
DIST. OF CO.

HAWAII 1951

NEW ORLEANS

VIRGIN IS.

PUERTO RICO

Records Maintained in Area Offices.

Records Maintained in Individual Courts.

Central Divorce Files Established Since 1945 Indicated by Year.

Procedure manuals for use with the standard report forms are being developed by the National Office of Vital Statistics and the State registrars. These manuals will cover definitions of terms; suggested coding, punching, and tabulating instructions; and related matters.

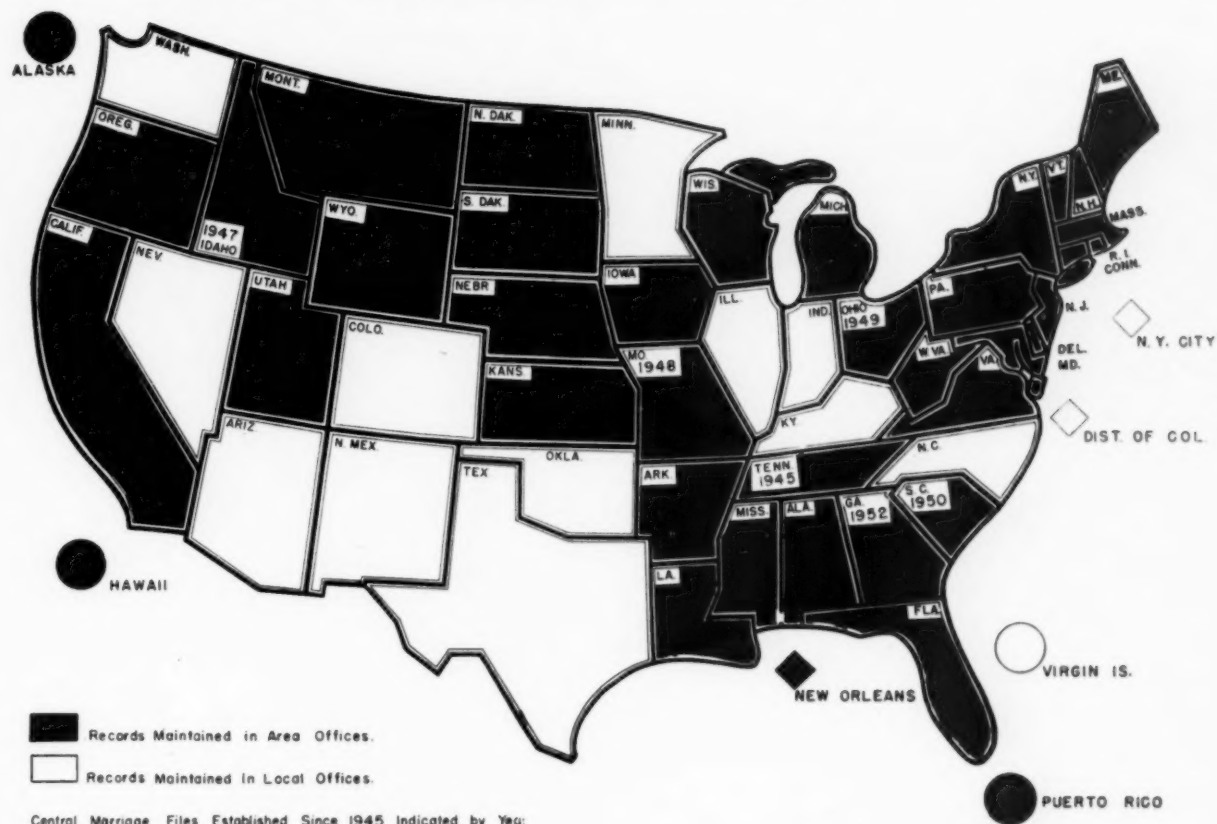
Since 1945, the accuracy of annual statistics of marriages and divorces for the United States has increased. The amount of necessary estimating for missing data from nonreporting areas has been reduced since more comprehensive reports are now received from the States.

The data are tabulated according to table outlines distributed annually by the National Office of Vital Statistics. Under this program the cost of obtaining the data is minimal to the Federal Government. However, except for obvious errors and inconsistencies, it is impossible to ascertain the accuracy of the tabulations received from the States. Quality controls are the responsibility of each reporting State.

Monthly statistics of marriages or marriage licenses on a provisional basis have been published since 1944 (11-13). Special tabulations of marriage licenses for cities of over 100,000 population cover data from 1939 (13-16). Monthly statistics on divorces for reporting



Figure 2. Thirty-four areas maintaining centralized divorce records, 1954.



areas began with 1949 data. At that time regular reports were received from 16 areas (12). By 1954 the number of areas reporting divorces each month totaled 30 (13).

National statistics on the social characteristics of persons at the time of marriage are also being compiled on the basis of national sample surveys conducted in cooperation with the Bureau of the Census. The first of these surveys was carried out in 1953 (17) and the second, in 1954. These sample surveys have provided a valuable supplement to the presently incomplete data obtained from registration records. Additional reports will provide data on economic and social characteristics of recently married persons.

#### Plans for the Future

The Working Group on Marriage and Divorce of the Public Health Conference on Records and Statistics has recommended certain steps to improve national marriage and divorce

statistics. These recommendations have been given a vote of approval by the great majority of the members of the conference and are now being implemented as follows:

A registration area for marriage statistics is to be established, effective January 1, 1956. One year later a registration area for divorce statistics will be established. The criteria for admitting a State or an independent registration area to the marriage registration area, and later, to the divorce registration area, have been agreed upon. These include—

1. Central record files for marriages and divorces containing items on the standard record of marriage and standard record of divorce or annulment forms, in the State office.
2. Adoption of report forms of marriage and divorce containing the items on the standard record of marriage and standard record of divorce or annulment forms.
3. Regular reports to the State office by all local areas.
4. Agreement between State office and the

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## Information Requested on Standard Record of Marriage

### Items on Form:

County

State file No.

### Application for marriage license:

For both bride and groom—

Name (first, middle, last)

Date of birth (month, day, year)

Usual residence (State, county, city, or town)

Place of birth (State or foreign country)

Previous marital status

Number of previous marriages

Color or race

Usual occupation

Kind of business or industry

Date and signatures of applicants

### Certification:

Date of marriage (month, day, year)

Place of marriage (county, State)

Date of recording

Signature and title of official making return to State health department

### Optional Additional Items Recommended by the Working Group on Marriage and Divorce:

In States receiving original records of marriage, the word "Certificate" may be substituted for "Record."

In addition to "State file No.," provision may be made for "Local file No."

In item for "Usual residence," provision may be made for "Street address or RFD No."

### The following items may be added:

Names of parents

Name or signature, title, and denomination of officiant

Religious preference or denomination of bride and groom

### Possible additional items:

The item "Highest grade of school completed" has merit as an optional item for States that may be interested in the subject, although it was not discussed at the last meeting of the working group.

National Office of Vital Statistics on joint testing of reporting for completeness and accuracy.

The key criterion relates to tests of completeness and accuracy. Agreement is to be reached between the National Office of Vital Statistics and the individual States regarding the tests to be carried out in each State. These tests will aid in locating any imperfections in the reporting system of a given State so that remedial steps may be taken. In the preparation of a working document on tests of completeness and accuracy of marriage reporting, it became evident that the index to State files of marriage records was of crucial importance; consequently, a detailed study of such State indexes is being made. In the fall of 1955, it is planned to provide the Working Group on Marriage and Divorce with data on all States maintaining central files of marriage records and to ask the advice of the working group regarding the States to be admitted to the marriage registration area in January 1956.

A marriage registration test (MRT) in connection with the 1960 census has been proposed by several State registrars. This would parallel the birth registration test (BRT) in 1940 and 1950. This possible project will be explored with officials of the Bureau of the Census. A divorce registration test in 1960 has been suggested.

Further exploration will be made of sample surveys in obtaining useful marriage and divorce data. The results obtained so far are distinctly encouraging.

The needs of the consumers of marriage and divorce statistics will be studied by subcommittees of the United States National Committee on Vital and Health Statistics appointed by the Surgeon General of the Public Health Service. A subcommittee on utilization of marriage statistics is bringing together persons with varied interests to determine the types of information most useful to major consumer groups. It may propose a consumer survey. A similar committee on divorce statistics will be established at a later date. The reports of these two committees will provide a basis for possible modification of the program of marriage and divorce statistics to meet the needs of the consumers.

## Information Requested on Standard Record of Divorce or Annulment

### Items on Form:

County

State file No.

Local file No.

For husband—

Name, (first, middle, last)

For wife—

Maiden name (first, middle, last)

For both husband and wife:

Date of birth (month, day, year)

Usual residence (city, county, State)

Place of birth (State or foreign country)

Number of this marriage

Race or color

Usual occupation

Kind of business or industry

Place of this marriage

Date of marriage (month, day, year)

Number of children under 18

Plaintiff

Decree granted to

Legal grounds for decree

### Optional Additional Items Recommended by the Working Group on Marriage and Divorce:

In States that grant other than absolute divorces, title may include word "Absolute."

In item "Usual residence," provision may be made for "Street address or RFD No."

To item "Number of children under 18" may be added "Number of children born alive this marriage."

To item "Legal grounds for decree" may be added "Number of children to custody of—husband; wife; other (specify)".

To item "Number of this marriage" may be added "Last marriage ended by—death, divorce, annulment."

To item "Place of this marriage" may be added "Date of separation" and "Place of separation."

### Possible additional items:

The item "Highest grade of school completed" has merit as an optional item for States that may be interested in the subject, although it was not discussed at the last meeting of the working group.

### REFERENCES

- (1) Carter, H.: Improving national marriage and divorce statistics. *J. Am. Statis. A.* 48: 453-461, September 1953.
- (2) U. S. National Office of Vital Statistics: Marriage statistics: Specified States, 1948. *Vital Statistics—Special Reports*, vol. 35, No. 9. Washington, D. C., U. S. Government Printing Office, 1950.
- (3) U. S. National Office of Vital Statistics: Divorce and annulment statistics: Specified States, 1948. *Vital Statistics—Special Reports*, vol. 35, No. 12. Washington, D. C., U. S. Government Printing Office, 1950.
- (4) U. S. National Office of Vital Statistics: Statistics on marriages: Specified States, 1949. *Vital Statistics—Special Reports*, vol. 36, No. 6. Washington, D. C., U. S. Government Printing Office, 1951.
- (5) U. S. National Office of Vital Statistics: Statistics on divorces and annulments: Specified States, 1949. *Vital Statistics—Special Reports*, vol. 36, No. 7. Washington, D. C., U. S. Government Printing Office, 1951.
- (6) U. S. National Office of Vital Statistics: Statistics on divorces and annulments: Specified States, 1950. *Vital Statistics—Special Reports*, vol. 37, No. 4. Washington, D. C., U. S. Government Printing Office, 1952.
- (7) U. S. National Office of Vital Statistics: Statistics on marriages: Specified States, 1950. *Vital Statistics—Special Reports*, vol. 37, No. 5. Washington, D. C., U. S. Government Printing Office, 1952.
- (8) U. S. National Office of Vital Statistics: Statistics on divorces and annulments: Reporting areas, 1951. *Vital Statistics—Special Reports*, vol. 38, No. 3. Washington, D. C., U. S. Government Printing Office, 1954.
- (9) U. S. National Office of Vital Statistics: Divorce and annulment statistics: Reporting areas, 1952. *Vital Statistics—Special Reports*, vol. 40, No. 6. Washington, D. C., U. S. Government Printing Office, 1955.
- (10) U. S. National Office of Vital Statistics: Marriage statistics: Reporting areas, 1952. *Vital Statistics—Special Reports*, vol. 40, No. 7. Washington, D. C., U. S. Government Printing Office, 1955.
- (11) U. S. National Office of Vital Statistics: Marriage licenses issued in the United States, by State, 1944-48. *Quarterly marriage report*, vols. 1-3. Washington, D. C., U. S. Government Printing Office, 1946-49.
- (12) U. S. National Office of Vital Statistics: Births, deaths, infant deaths, and marriage licenses, 1948-51. *Monthly Vital Statistics Bull.*, vols. 12-14. Washington, D. C., U. S. Government Printing Office, 1949-52.

- (13) U. S. National Office of Vital Statistics: Provisional statistics on births, marriages, and deaths, with data on causes of death and on divorce 1951-54. Monthly Vital Statistics Report, vols. 1-3. Washington, D. C., U. S. Government Printing Office, 1952-55.
- (14) U. S. Bureau of the Census: Marriage licenses issued in cities of 100,000 inhabitants or more, 1939-44. PM-1, No. 4. Washington, D. C., U. S. Government Printing Office, 1945.
- (15) U. S. Bureau of the Census: Marriage licenses issued in cities of 100,000 inhabitants or more, 1943-46. PM-2-PM-4. Washington, D. C., U. S. Government Printing Office, 1944-47.
- (16) U. S. National Office of Vital Statistics: Marriage licenses issued in major cities, 1946-51. Monthly Marriage Report, vols. 1-5. Washington, D. C., U. S. Government Printing Office, 1947-52.
- (17) U. S. National Office of Vital Statistics: Demographic characteristics of recently married persons: United States, April 1953. Vital Statistics—Special Reports, vol. 39, No. 3, Washington, D. C., U. S. Government Printing Office, 1954.

### PHS Civil Defense Training

The Public Health Service has offered the first of a series of 2-week training courses for physicians and other professional health personnel who would be called to duty in the event of enemy action or other national emergency.

The training courses are a phase of the Service's recently announced emergency program to expand its Commissioned Reserve Corps by 5,000 officers before July 1, 1956.

The course started on March 14, 1955. A second 2-week course is scheduled for May 15. Additional courses will be scheduled later.

Each course covers two main categories: one, the tasks with which a health department staff is generally familiar but for which additional help is required, such as those created by extensive disruption of public facilities and mass displacement of civilians in consequence of enemy action or natural disaster; and, two, the unusual tasks for which new skills as well as additional help may be needed by a health department, such as chemical, biological, and radiological warfare defense, epidemic reporting, monitoring radioactivity, decontamination, and related action.

During the first week, trainees spend 3 days at the Federal Civil Defense Administration Staff College at Olney, Md., on the outskirts of Washington, D. C. There they receive briefing on the strategic aspects of civil defense. The remainder of the period is spent at Public Health Service headquarters in Washington.

Additional information may be obtained from: Chief, Training Branch, Division of Personnel, Public Health Service, Department of Health, Education, and Welfare, Washington 25, D. C.



*Gamma globulin, administered to a group of orthopedically disabled children in a hospital school, failed to prevent or modify measles in a proportion of the cases.*

## Effect of Gamma Globulin on Measles

By OTTO L. BETTAG, M.D., FREDERICK PLOTKE, M.D.,  
and HAROLD M. STERLING, M.D.

THE INCIDENCE of complications with or following measles has led to various attempts at modification or prevention (1, 2). At present, the use of gamma globulin is considered the most effective means of preventing measles (3, 4). Since it is important in some instances to prevent this illness and in others to modify it, much effort has been directed recently toward establishing an optimum dosage (5, 6).

Current recommendations call for the administration of gamma globulin by the intramuscular route in a dosage of approximately 0.02 cc. per pound of body weight for modification and of 0.1 cc. per pound of body weight for prevention of measles (7-9). At least one worker has presented evidence that 0.02 cc. per pound of body weight is excessive since this "modifying" dosage frequently appears to prevent the disease completely (10).

The effectiveness of gamma globulin in preventing or modifying the course of measles was studied during an epidemic in the spring of 1954 at the Illinois Children's Hospital School, Chicago.

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The study included 92 permanent resident children at this institution. At the time of this report, the shortest period of residency in this hospital school was 2 and the longest 8 years.

The diagnostic categories included 35 children with cerebral palsy, 26 children with residual paralysis following poliomyelitis, 5 children with paraplegia following trauma, 2 children with paraplegia following transverse myelitis, 3 with paraplegia due to spina bifida, 5 with muscular dystrophy, and 16 with other disorders. The children in general represented the more severe forms of these conditions. Approximately one-third of the students are almost or totally helpless. In this latter group illness of any kind or complications thereof would be serious.

The review of the status of the children at the time of this study showed that of the 92 children, 16 had no history of exanthemata; 66 had a definite history, and 10 had a questionable history of measles (table 1).

The age range for the group was 5 to 20 years. The average age was 12 years; 82 were white, and 10 were Negroes; 52 were males and 40 females. The patients were observed under the condition of this study from March 1, 1954, to May 15, 1954.

For the study the children were divided into three groups:

Group 1 comprised 58 children in good physical condition who had a positive history of

**Table 1. Immunity status of 92 children according to diagnosis**

Diagnosis	Number of patients	History of previous measles	Questionable history of previous measles
Brain injury (cerebral palsy)-----	35	25	2
Postpoliomyelitis-----	26	23	0
Paraplegia-----	10	8	2
Muscular dystrophy-----	5	3	2
Other-----	16	7	4
Total-----	92	66	10

measles. These children were considered immune, and gamma globulin was not administered to them (11).

Group 2 consisted of 24 children in good physical condition who by history were considered susceptible. "Modifying" doses of gamma globulin were given to this group (12).

Group 3 included 10 children for whom measles, or its complications, was considered dangerous. This group was protected by the administration of "preventive" doses of gamma globulin, irrespective of a previous history of measles.

Group 3 consisted of:

Two students with previous history of measles, both manifesting severe respiratory difficulties following paralytic poliomyelitis.

Two students with indefinite history of measles; both had progressive central nervous system degenerative disease.

Six students with no history of measles—3 severe dystonic athetoid cerebral palsy cases, 2 muscular dystrophy cases, and 1 spastic paraplegia case with primary tuberculous infection.

The first case of measles in this epidemic developed March 5, 1954, in a child who was isolated in his room from the onset of the symptoms (except for part of one day) 3 days prior to the appearance of a rash. It was later learned that during a visit with relatives he was in contact with a child who subsequently developed measles. Immediately after the rash appeared in this first case, the child's entire residential floor was quarantined in an attempt to prevent the spread of the disease. Gamma globulin was administered to all those for whom it was indi-

cated on the fourth day of probable exposure.

During the following week several new measles cases appeared, but none occurred on the residential floor originally quarantined. As soon as the new cases were diagnosed, the 24 students in group 2 presumed susceptible because of no known previous attacks of measles were moved to a single residential floor. The group 1 students with natural immunity and the group 3 children with immunity passively conferred by gamma globulin continued as usual their activities of school, treatment, and home visits. For those quarantined, schooling and the various types of treatment were carried on in their quarters.

Six of the ten students in group 3 subsequently developed measles. One had an onset 11 days, two 12 days, one 17, one 18, and one 38 days after gamma globulin administration. Four children had mild and 2 had moderate cases. There were no significant sequelae to the infection. Thus, of the 10 persons for whom measles was presumed to be dangerous, 6 contracted the disease in spite of administration of the accepted "protective" dose.

The 2 children afflicted with moderate cases of measles also developed German measles 30 and 45 days, respectively, after the onset of their measles. Two others who did not have measles developed German measles approxi-

**Table 2. The effect of preventive doses of gamma globulin according to disease category**

Diagnosis	Number of patients receiving preventive dose of gamma globulin	Number of patients receiving gamma globulin and subsequently developing measles	Percentage of patients developing measles
Brain injury-----	3	1	33
Postpoliomyelitis-----	2	1	50
Muscular dystrophy-----	2	2	100
Other:			
Pelizaeus-Merzbacher-----	1	0	0
Amyotonia congenita-----	1	1	100
Congenital lower motor paralysis, unknown etiology--	1	1	100
Total-----	10	6	60

mately 6 weeks after gamma globulin administration. One of these students, with progressive central nervous system degeneration (Pelizaeus-Merzbacher syndrome), appeared to deteriorate rapidly following relatively mild German measles.

A breakdown of patients developing measles after a "protective" dose of gamma globulin given at least 11 days prior to onset of symptoms is shown in table 2. The gamma globulin failures were distributed among a wide range of degenerative diseases.

Of the 24 students who received "modifying" doses of gamma globulin, 19 developed measles, and in 8 of these German measles developed subsequently. Four of the 19 had severe cases of measles and 4 others had complications of some sort.

Of the 58 students with positive histories of measles, 20 students developed measles, 4 German measles, and 3 had both. Three had some type of complications.

### Summary and Conclusions

An epidemic of measles followed by an epidemic of German measles occurred in a residence school for 92 orthopedically disabled children, 16 having no previous history of exanthemata. The possibility of progression of basic conditions or of seriousness of sequelae prompted an attempt to prevent the disease in 10 pupils by the administration of 0.1 cc. gamma globulin per pound of body weight intramuscularly on the fourth day after exposure; 24 others received 0.02 cc. per pound of body weight to modify the illness; 58 students, who had positive histories of measles, received no gamma globulin and, therefore, were not quarantined.

Six children developed measles at least 11 days after receiving a "preventive" dose of gamma globulin. Of these, 4 had mild and 2 had moderate measles, but none had complications from this disease. One child suffered rapid progression of the basic condition following a subsequent attack of German measles.

A previous history of measles was of no value

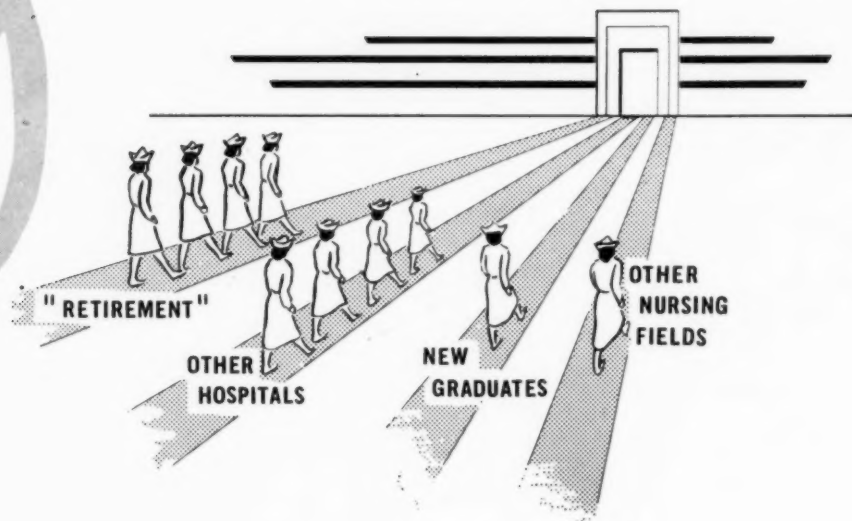
in deciding who should receive gamma globulin, since 20 students with such histories developed measles, 4 German measles, and 3 both. Three had complications of some type.

Gamma globulin in the dosage currently recommended for prevention of measles failed to protect 6 out of 10 children to whom it was administered. Gamma globulin in "modifying" dosage apparently failed to modify the disease in 4 out of 19 students to whom this dosage was administered. There was no evidence that gamma globulin prevented or modified German measles.

### REFERENCES

- (1) McKhann, C. F.: The prevention and modification of measles. *J. A. M. A.* 109: 2034-2038 (1937).
- (2) Sweet, C.: Measles: Its prophylactic treatment with blood of immune persons. *California & West. Med.* 38: 254-260 (1933).
- (3) Ordman, C. W., Jennings, C. G., Jr., and Janeway, C. A.: Use of concentrated human serum gamma globulin in prevention and attenuation of measles. *J. Clin. Investigation* 23: 541 (1944).
- (4) Janeway, C. A.: Clinical use of products of human plasma fractionation. *J. A. M. A.* 126: 674-680 (1944).
- (5) Greenberg, M., Frank, S., and Rutstein, D. D.: Gamma globulin and placental globulin. *J. A. M. A.* 126: 944-947 (1944).
- (6) Mele, L.: Prophylaxis against measles with gamma globulin in fifteen thousand subjects, treated frequently. *Minerva pediat.* 2: 591 (1950).
- (7) Cathala, J., and Straus, P.: Prevention de la rougeole par la gamma globuline. *Arch. franç. pédiat.* 9: 881-885 (1952).
- (8) Coigny, R. L., and Straus, P.: Epidemiological study of measles as influenced by mass immunizations. *Presse Méd.* 59: 634 (1951).
- (9) Christensen, P. E., and Schmidt, H.: An epidemic of measles in southern Greenland, 1951. IV. Significance of specific prophylaxis. *Acta med. Scandinav.* 145: 126-142 (1953).
- (10) Bivings, L.: Gamma globulin dosage and measles control. *J. Pediat.* 43: 401-403 (1953).
- (11) Thamdrup, E.: Reinfection with measles. *Acta paediat.* 41: 276-282 (1952).
- (12) Karelitz, S.: Does modified measles result in lasting immunity? *J. Pediat.* 36: 697-703 (1950).

# Sources of Nurse Supply For New Hospitals



By EUGENE LEVINE, M.P.A., MAURICE E. ODOROFF, M.A., MARGARET G. ARNSTEIN, R.N., M.P.H.,  
and JOHN W. CRONIN, M.D.

THE OPENING of new hospitals in communities which formerly had none is attracting many nurses back to their profession. In 388 small communities that have built new hospitals since 1946 under the Hospital Survey and Construction Program, 2 of every 5 professional nurses employed on the staffs have come

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back to work from "retirement." This is one of the findings uncovered in a survey of nurses employed in these hospitals.

The survey was undertaken because the existing shortage of nurses raised questions about the sources of nurse supply for new hospitals. There were some indications that nurses were attracted back to their profession because hospitals were built where none existed before.

Two years ago in Texas, the hospital survey and construction division of the Texas State Department of Health found that 1 of 5 professional nurses employed in Hill-Burton hospitals in the State had been inactive before their employment (1). This finding raised the question of what was happening on a nationwide



basis. The Public Health Service, through the Division of Nursing Resources and the Division of Hospital Facilities, designed a study to answer the following questions:

Are the new hospitals recruiting many members of their nursing staffs out of retirement?

Why do nurses take jobs in these hospitals?

How do nurses find out about the vacancies?

How well staffed are the nursing services?

### How the PHS Study Was Conducted

Questionnaires were sent in May 1954 to 516 hospitals—388 new Hill-Burton hospitals and 128 hospitals established before the Hill-Burton program began. (The Hospital Survey and Construction Act was passed in 1946, Public Law 725, 79th Cong., 2d Sess.; and the first hospital was opened on October 15, 1948.) The latter hospitals, similar in location, size, and type to the Hill-Burton group, served as a control group and formed a basis for evaluating findings from the new hospitals.

The individual nurses filled out the questionnaires, and the hospitals provided data on bed capacity, patient census, staffing, and vacancies. One or more forms were received from 403 hospitals in 36 States.

Returns by type of hospital were as follows:

	<i>All hospitals</i>	<i>New</i>	<i>Older</i>
Number of hospitals where nurses received forms....	516	388	128
Number of hospitals returning 1 or more forms..	403	322	81
Percentage returns.....	78.1	83.0	63.3

A total of 2,311 professional nurses in the new hospitals and 634 in the older group participated in this study. These participants represent two-thirds of the nurse staff of the new group and three-fifths of the nurse staff of the older group. The results of this study are considered reliable because of the large proportion of hospitals and nurses who responded.

### Staffing Patterns

Three characteristics distinguish the 403 hospitals that participated in the survey:

## Staffing the New Hospital

This recent study of recruitment of 2,311 professional nurses in new Hill-Burton rural hospitals and a control group of 634 nurses in 81 hospitals built before the Hospital Survey and Construction Program began in 1948 reveals the following facts: ▶Two out of every five nurses employed in rural hospitals (old and new) were previously housewives and thus retired from the nursing profession. New rural hospitals, by creating employment opportunities where none existed before, are attracting back to work many nurses who probably would have remained permanently inactive professionally. ▶The new Hill-Burton hospitals have fewer professional nurses per patient than the average hospital in the United States. However, they have so many more nonprofessional nurses that the total number of nurses per patient is higher.

▶Fifteen percent of the professional nurse positions in the new hospitals are vacant. There is some evidence in the survey that these hospitals have a fairly high turnover rate—although probably no higher than other hospitals.

▶Many nurses who previously were working in hospitals in other localities came to work in new hospitals because they could return to their home towns to live. Most inactive nurses returned to work in order to help relieve the nursing shortage or to assist with the financial upkeep of their families.

▶The best way to recruit new nursing personnel is by personal contact. Hospitals can help solve staffing problems by keeping good relations with their own employees and with the public.

They are small—97 percent of both these new and older hospitals have less than 100 beds (table 1) compared with 66 percent in the country as a whole.

They are the only hospital facilities serving areas where they are located.

They are located in towns serving semi-rural and rural areas—the majority in towns of less than 5,000 people (table 1).

Because of these characteristics, the problems of recruiting nurses in these hospitals are different from those in large cities. Surveys of nursing needs and resources in various States during the last few years have indicated that

**Table 1. Size of 403 hospitals in the study and size of communities in which they are located**

Size of hospitals and community	Number of hospitals		Percent of hospitals	
	New	Older	New	Older
Total.....	322	81	100. 0	100. 0
Number of beds:				
Under 25.....	96	13	29. 8	16. 0
25-49.....	140	36	43. 5	44. 5
50-99.....	73	30	22. 7	37. 0
100 and over.....	13	2	4. 0	2. 5
Total.....	322	81	100. 0	100. 0
Population: <sup>1</sup>				
Under 5,000.....	255	43	79. 2	53. 1
5,000-9,999.....	47	29	14. 6	35. 8
10,000-24,999.....	17	9	5. 3	11. 1
25,000-49,999.....	2	-----	. 6	-----
50,000 and over.....	1	-----	. 3	-----

<sup>1</sup> According to 1950 census of population.

hospitals in small towns often have difficulties in attracting the personnel they need, primarily because the available social and cultural opportunities are limited.

The study shows the new Hill-Burton hospitals have fewer professional nurses for every 100 patients than the average hospital in the country—but the total number of nursing personnel is actually higher. (It was not the purpose of the study, nor is it possible from these data, to draw any conclusions on the adequacy of nursing care.) Comparative figures for the number of nursing personnel giving direct care per 100 patients follow:

	All nursing personnel	Professional nurses	Other nursing personnel
All general hospitals, United States (2).....	74	34	40
New hospitals in survey..	79	24	55
Older hospitals in survey..	67	26	41

Although the Hill-Burton hospitals have more nursing personnel than the national average, they probably are not better staffed than hospitals as a whole. Where staffing of professional nurses is low, a higher number of other nursing personnel—practical nurses, aides, orderlies—is needed because these auxiliary per-

sonnel do not substitute for professional nurses on a 1 to 1 basis. Also, small hospitals need a higher ratio of nurses to patients than large hospitals in order to provide the around the clock, 7 days a week nursing service required in all hospitals.

For every 100 patients, the new hospitals have 24 professional nurses and 55 practical nurses, aides, and other members of their nursing staffs; the older hospitals have 26 professional nurses and 41 other members of their nursing staffs.

The higher personnel-to-patient ratios in the Hill-Burton hospitals are partially offset by a shorter workweek than in the older hospitals. The trend in the new hospitals is toward a workweek of 44 hours or less. In the older hospitals the average workweek is closer to 48 hours. Adjustment for the workweek differential results in an average figure of 4.6 daily hours of nursing care per patient in Hill-Burton hospitals and 4.2 hours in the control hospitals and, also, a lower ratio of professional to nonprofessional nurses in the Hill-Burton hospitals. Although the new hospitals have more nursing personnel, they are not much better staffed than the older hospitals since the patients receive only a little more care. The vacancy rate in professional nurse positions in the two groups of hospitals is almost identical, about 15 percent.

Tenure is one of the problems in keeping a hospital staffed with nurses. The average number of years the Hill-Burton hospitals have been in operation is about 3 (the oldest hospitals in this group opened at the end of 1948). The average number of years the 2,311 nurses have been working in these hospitals is 1.3. Allowing at least 6 months for new hospitals to come up to full staffing, there is still evidence of considerable turnover. In the older hospitals the turnover is high, too. The average number of years of employment for nurses is 2.8 and the period of years these hospitals have been in operation ranges from 6 to 60.

### Previous Employment

Two of every five nurses employed in the Hill-Burton hospitals were previously housewives and thus "retired" from the profession (table 2). Similarly, the older hospitals recruited the same proportion of their nursing staffs out of

**Table 2. Previous status of professional nurses**

Previous status	Number of nurses		Percent of nurses	
	New hos- pitals	Older hos- pitals	New hos- pitals	Older hos- pitals
Total.....	2, 311	634	100. 0	100. 0
Inactive nurse.....	873	229	37. 8	36. 1
Student undergraduate.....	273	113	11. 8	17. 8
Student graduate.....	22	5	1. 0	. 8
Hospital nurse.....	866	190	37. 4	30. 0
Other nursing <sup>1</sup> .....	273	94	11. 8	14. 8
Unknown.....	4	3	. 2	. 5

<sup>1</sup> Private duty, office, public health, and industrial nursing.

retirement. These nurses did not retire because of age. They retired usually because of home and family responsibilities. Their average age is 35, the same as the average age of all active nurses in the United States (3).

In addition to the supply of nurses who are already employed elsewhere, new hospitals have two major sources of nurse supply: the nurses graduating from schools of nursing, and those willing to return to work from temporary retirement. Both sources are limited. We know that there are only 25,000 new graduates each year (3), barely enough to meet the annual replacement needs in the 7,000 hospitals in the country in addition to other fields of nursing. The other source, inactive nurses, is unpredictable, because the borderline between temporary and permanent retirement for some nurses is slight. Factors causing a nurse to return to active practice are mostly beyond the control of those concerned with relieving the nursing shortage. Hospitals can encourage nurses to come back to the active practice of the nursing profession by providing good opportunities for service, including suitable hours and convenient location.

A new hospital in a rural area creates job opportunities close to home and offers attractive employment to many inactive nurses who otherwise would probably remain inactive professionally. The survey showed that nearly 90 percent of the nurses in both the Hill-Burton and the older hospitals who were inactive before accepting their present jobs had lived, at some time in their lives, in the areas where they are now employed. Most of them were living in these areas

at the time they accepted their present jobs. Since the new hospitals are the only hospital facilities in the areas, this finding raises the question whether inactive nurses would have returned to work without the existence of the new job opportunities. Most of the nurses formerly inactive are married, and probably could not migrate easily to other areas to seek employment.

On the other hand, among the nurses who were active in nursing before taking their present jobs, there are more single than married nurses. It probably was easier for them to move from one area to another to change jobs. Nearly two-thirds of the nurses in Hill-Burton hospitals who previously worked in other hospitals—which, of course, were in other localities—were actually returning to their own home towns when they accepted their present jobs. They might have preferred to go to work in their home towns earlier, when first graduating from schools of nursing, but could not do so until there were opportunities. After the new hospitals were built they could return to home communities to nurse.

One nurse said on the questionnaire, "My home is here, and when this hospital opened I found it more convenient to work here than where I was formerly employed."

#### Reasons for Accepting Present Jobs

The reasons the nurses gave for taking their present jobs varied considerably according to their previous employment (table 3). Those who were formerly inactive had various motiva-

**Table 3. The reasons why professional nurses in new hospitals accepted their jobs**

Reason for accepting present job <sup>1</sup>	Total	Inactive nurse	Undergraduate student	Graduate student	Hospital nurse	Other nurse	Unknown
Number of nurses							
Total.....	2,311	873	273	22	866	273	4
Hospital is close to home.....	820	187	184	12	341	96	-----
For economic advantages.....	305	180	14	1	88	21	1
To help relieve shortage.....	266	206	2	-----	30	26	2
To continue nursing career.....	191	179	1	-----	9	2	-----
Prefer working in a general hospital.....	153	16	12	1	53	71	-----
Good working conditions in hospital.....	140	26	10	1	86	17	-----
Husband transferred to area.....	95	12	4	1	60	18	-----
To gain experience in small hospital.....	89	11	24	3	45	6	-----
To work in a new hospital.....	67	26	7	1	28	5	-----
Only hospital in community.....	17	7	3	-----	4	2	1
Other reasons.....	84	-----	-----	-----	82	2	-----
Unknown reasons.....	84	23	12	2	40	7	-----
Percentage of nurses							
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	( <sup>2</sup> )
Hospital is close to home.....	35.5	21.4	67.4	54.6	39.4	35.2	-----
For economic advantages.....	13.2	20.6	5.1	4.5	10.2	7.7	-----
To help relieve shortage.....	11.5	23.6	.7	-----	3.4	9.5	-----
To continue nursing career.....	8.3	20.5	.3	-----	1.0	.7	-----
Prefer working in a general hospital.....	6.6	1.8	4.4	4.5	6.1	26.0	-----
Good working conditions in hospital.....	6.1	3.0	3.7	4.5	10.0	6.2	-----
Husband transferred to area.....	4.1	1.4	1.5	4.5	6.9	6.6	-----
To gain experience in small hospital.....	3.8	1.3	8.8	13.7	5.2	2.2	-----
To work in a new hospital.....	2.9	3.0	2.6	4.5	3.2	1.9	-----
Only hospital in community.....	.8	.8	1.1	-----	.5	.7	-----
Other reasons.....	3.6	-----	-----	-----	9.5	.7	-----
Unknown reasons.....	3.6	2.6	4.4	9.2	4.6	2.6	-----

<sup>1</sup> Where more than one reason was given, the first reason stated was tabulated.

<sup>2</sup> Numbers too small to compute percentages.

**Table 4. How professional nurses in new hospitals learned about vacancies in the hospital where now employed**

Source of information on vacancy	Number of nurses		Percent of nurses	
	New hospitals	Older hospitals	New hospitals	Older hospitals
Total.....	2,311	634	100.0	100.0
Person in hospital.....	1,136	391	49.2	61.7
Direct inquiry.....	523	116	22.6	18.3
Person outside hospital.....	377	81	16.3	12.8
Newspaper advertisement.....	93	4	4.0	.6
Employment agency.....	13	7	.6	1.1
Professional journal.....	7	1	.3	.1
Other sources.....	98	10	4.2	1.6
Unknown sources.....	64	24	2.8	3.8



tions; the most important was the desire to help relieve the nursing shortage.

"The hospital needed nurses, and I wished to nurse," said one.

Economic reasons and the desire to continue their careers were also important. "When the hospital was constructed here, I was happy to get back into the nursing profession," said another.

"The satisfaction derived from the work as well as financial help were important," one nurse wrote.

The newness of the hospital attracted others: "After being inactive for a number of years—this new, modern, convenient building was a big temptation."

Nine out of ten of the formerly inactive nurses had lived, at some time in their lives, in the areas where they were now employed, and most of them were living in these areas just before accepting their present work. The opening of the new Hill-Burton hospitals brought them job opportunities. They did not accept their present jobs to be close to home—they were already home. Most of the nurses who were active before accepting present jobs came to the new hospitals from other areas although 7 of every 10 had lived at some time in the past in the areas where they are now employed. Being accepted for their present jobs enabled them to return to their home towns.

"This position made it possible to be near my parents after being away 10 years in college, training, work," said a nurse formerly employed in another hospital.

For the nurses who had been attending school, more than for any of the others in the survey, the hospital's nearness to their home communities was the most important reason they gave for accepting present jobs. This reflects the fact that some nurses who left home to obtain their nursing education returned when there were suitable job opportunities available. For nurses previously in school, the desire to broaden their educational background by gaining experience in a small hospital ranked second among the reasons for accepting jobs in new hospitals.

According to replies to the questionnaire, some factors that are under the hospitals' control, such as good personnel policies, apparently play only a small role in recruiting nurses for the new hospitals. Only among nurses who formerly worked in other hospitals did this item have any effect at all. This suggests that satisfactory working environmental conditions may not be the primary consideration in choosing a job. Other studies (4), however, have shown that dissatisfaction with personnel policies is responsible for much of the high turnover in hospitals.

#### How Positions Were Advertised

As has been found elsewhere (4, 5), the best way to recruit new nursing personnel is by "word of mouth." Nearly 60 percent of the nurses in the new hospitals learned about the vacancies either from someone in the hospital or from a friend or relative not employed by the hospital (table 4). Few nurses were recruited by advertisements appearing in newspapers or professional journals. This finding indicates the desirability of hospitals keeping their employees informed of vacancies and of maintaining good relations with the general public.

#### REFERENCES

- (1) Texas State Department of Health: A special study of professional nurses in new hospitals. Unpublished report dated February 6, 1953.
- (2) Arestad, F. H., and McGovern, M. A.: Hospital service in the United States. The 1953 census of hospitals. Thirty-third annual presentation of hospital statistics by the Council on Medical Education and Hospitals of the American Hospital Association. Reprinted, with supplement, from the *Journal of the American Medical Association*, hospital number, May 15, 1954, 108 pp.
- (3) Tibbitts, H. G., and Levine, E.: Health manpower source book. Section 2. Nursing personnel. Washington, D. C., U. S. Government Printing Office, 1953, 88 pp.
- (4) Abdellah, F. G., and Levine, E.: Why nurses leave "home." *Hospitals* 28: 80-81, pt. 1, June 1954.
- (5) Schoenfeld, H.: Why people work in hospitals. *Hospitals* 26: 60-62, December 1952.

*Many physicians have served in Samoa, but few have written about the health problems of these enchanting islands.*

## Notes on Public Health in American Samoa

By EDWARD KUPKA, M.D., M.P.H.

AMERICAN SAMOA is the only United States possession south of the Equator. Just within the southern limit of the Torrid Zone and south of Hawaii, it comprises the smaller eastern end of an archipelago of islands, the western end being a New Zealand trust territory, and formerly a German possession.

American Samoa is made up of seven islands, chiefly Tutuila and the three small islands known as the Manua group. The inhabitants are Polynesians, of the same race and with almost the same language as Tahitians, the Tongans, and the Hawaiians. In number 18,000, these people live on the narrow rims of the islands, between the volcanic mountains that cover most of the area and the beaches.

The island economy is agricultural. The Samoans cultivate taro, breadfruit, and coconut. They catch shellfish and fish and raise pigs and chickens. Several or many families

form a village, presided over by village elders and an elected chief. The primary loyalty of each Samoan is to his village, which gives him complete security in exchange for his work and faithfulness.

The Samoans are Christians, although their religion incorporates some of the rudiments of their earlier beliefs. Their manner of life has changed little since Margaret Mead wrote her famous "Coming of Age in Samoa" three decades ago.

### Under Navy Administration at First

When the United States Government, at the request of the chiefs of eastern Samoa, and as part of a treaty arrangement with England and Germany, took over the sponsorship and the protection of the islands at the end of the 19th century, the task of administration was given to the Department of the Navy. A high-ranking naval officer was selected as Governor, assisted by a staff of Navy administrative and technical personnel.

A legal code, which combined basic American law with a respectful regard for Samoan custom, was adopted, and a strong legislative body composed of all the senior chiefs was established. Roads were built, utilities created, and homes, offices, workshops, and warehouses were erected.

The harbor at Pago Pago, considered one of the best in the world and made known to literature by Somerset Maugham's "Rain," became

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the site of a naval base. During World War II, Tutuila was a Marine base, and scores of thousands of Americans were temporary residents there.

In 1951, by Presidential decree, the Navy closed the base, and the Department of the Interior was given administrative responsibility for American Samoa and for the Trust Territory of the Pacific Islands.

Since then, the Governor of American Samoa and his administrative and technical employees have been civilians, and usually American citizens. Samoans themselves are assuming more and more of the governmental positions as they acquire the necessary training, particularly in the field of teaching.

### **The Public Health Structure**

The Government departments are six: administration, justice, public works, Samoan affairs, education, and public health.

The Public Health Department is responsible for both preventive and curative activities.

The department's medical staff comprises a chief, a deputy (whose special functions are in the field of preventive medicine and the supervision of the district dispensaries), a surgeon, an internist, a pediatrician, and a tuberculosis specialist.

Staff members are usually Americans, although physicians educated in Europe have also been employed.

The nursing staff consists of a chief, the head of the nursing school, a public health nurse, and a tuberculosis head nurse. These positions are provided in the organization plan but are frequently vacant because of recruitment difficulties, so that doubling up of functions is common. (The same applies to the physician staff.) The duty period is 2 years.

There is a much larger cadre of Samoan physicians and nurses. The 12 Samoan physicians have the degree S.M.P., the abbreviation for Samoan medical practitioner. They are not considered fully trained physicians at graduation by our standards; their training was received either at the Suva Medical School in the Fiji Islands or at a similar institution which the Navy maintained for a time at Guam.

Promising young men from the various is-

lands of the South Pacific who speak some English are given a training which enables them to do simple medical practice. Some, by later serving for long periods under American physicians, become highly experienced and can be entrusted with major responsibilities.

Eight of the Samoan medical practitioners are at the Government of American Samoa Hospital, each in charge of a ward or clinic. The others serve in the four district dispensaries. During their early years they are rotated through the various services in order to give them broad experience.

The Samoan medical practitioners relieve the physicians of many of the routine duties: They take histories, perform and record physical examinations, and make progress notes. They write routine orders and keep the outpatient clinic records. They screen night calls and see to routine matters.

A Samoan medical practitioner is at the side of the physician most of the time, not only for his own training, but to give assistance and to act as translator since few of the patients speak English.

Including active graduates and present students, there are about 100 Samoan nurses who were all trained at the hospital and given the degree of S.N., which stands for Samoan nurse. The chief Samoan nurse was a member of the first graduating class almost 40 years ago.

Samoan nurses are carefully chosen Samoan women; they receive 4 years of training under Samoan and American nurses, somewhat comparable to the 3-year basic training in the United States, but with less academic and more practical training, rotating through all the services. Many marry and are lost as full-time nurses, but they remain a force for health education in the villages to which they return.

All physicians and nurses are government employees and enjoy high prestige. Nursing is about the only profession that a Samoan woman is permitted by her culture to enter. In the social scale, the Samoan physicians rank next to the chiefs and the pastors.

The Government of American Samoa Hospital is located on the west shore of Pago Pago Bay, on filled land, a scant half mile from the governmental offices and population center. It was built after World War II by uniting wooden



2-story military barracks in series, and putting the main service, administrative, and clinic functions into a new central concrete section.

The hospital can accommodate 250 patients. The largest number of occupied beds is for tuberculosis patients; next in order are those for pediatrics, surgery, medicine, and obstetric patients.

A small building separate from the hospital houses the leprosarium.

The Samoan nurses in residence live in remodeled barracks in front of the hospital, and the American employees live in cottages along the edge of the bay, a few hundred feet away.

The curve of foothills around the hospital grounds, heavily wooded, almost hides Utulei, one of the largest of the island's villages, where many of the Samoan employees live.

The district dispensaries were first established by the Navy and operated by pharmacist mates. They are located at outlying centers of population. Two are on the Manua Islands, 80 miles from Tutuila, and are connected by radio and by government steamer, which makes scheduled and emergency trips.

The larger of the dispensaries has a 10-bed hospital and the most experienced of all the Samoan medical practitioners.

Each dispensary is well supplied with drugs and first aid equipment, 1 or 2 beds for urgent care or deliveries, a minor surgery, and staffed by a Samoan medical practitioner and 2 or more district nurses. The dispensaries give first aid, treat minor illnesses, and perform normal deliveries. More serious cases and most major surgery are sent to the hospital.

With this staff and medical plant, the general and special medical and public health functions are conducted in a conscientious and thoroughgoing manner. The Samoan medical system ranks high among those of the Pacific Islands. The pioneering efforts of many Americans, Navy and civilian, contributed much, but the major factor in the success of the system was the intelligence and cooperation of the Samoans themselves.

#### **No Malaria, No Syphilis**

In approaching the special disease problems of the islands—all in the field of transmissible

diseases—one should first note that there have never been recorded any cases of malaria or syphilis although these diseases are common elsewhere in the South Pacific.

The absence of a suitable vector explains the freedom from malaria. Freedom from syphilis has been alleged to be due to the fact that most Samoans have had an episode of yaws early in life.

Yaws is a common problem but no longer a serious one because of the effectiveness of treatment in the early stages.

The Navy established yaws teams which went from village to village, treating everyone with lesions or suspected lesions of the skin. Arsenicals were used at first, and later penicillin. Severe lesions of active destructive yaws are rarely seen today.

Traveling teams are not now used, but dispensary nurses in their work in the villages find the yaws cases and send them to the hospital for treatment or treat them on the spot.

Intestinal parasitic infestation is almost universal after early childhood. Routine stool examinations were formerly made at the hospital, but since most of the patients were found to be positive for one or, more commonly, several parasites, this examination is now done only when especially indicated.

The Samoans tolerate their parasites well. *Ascaris* and *Trichuris* are the most common. *Ancylostoma* is of moderate frequency. Because they may play a secondary role along with malnutrition, in the serious pneumonias of early childhood, "deworming" clinics are held for children of all ages regularly at the beginning of each school semester.

The Government of American Samoa has been sending patients with leprosy to Makogai in the Fiji Islands where there is an excellent large leprosarium. The sufferers from Hansen's disease are thus sent 800 miles from home, and many, at least in the past, never return. This circumstance makes persons with the disease reluctant to seek treatment.

Although the Makogai institution is pleasantly located, and well run, with up-to-date treatment, and the Samoans carry on their own village life there, separated from the Fijis, the love of their own islands and villages at home is



strong, and they understandably do not want to go away.

About 40 American Samoans are at Makogai (pronounced *Makognai*). The reluctance of the others to seek treatment has been partially remedied by the building of a 10-bed leprosarium behind the Government of American Samoa Hospital, for isolation, observation, and initial treatment. The present plan is to enlarge the leprosarium or to build a small colony nearby for all of the leprosy patients on Tutuila. With modern drugs and ambulant treatment, a small unit may suffice.

### Filariasis and Tuberculosis

The two chief transmissible diseases are filariasis, and that special plague of the South Sea Islanders, tuberculosis. Acute bacterial pneumonia is the chief cause of death among the Samoans.

Filariasis, which was of considerable importance among military men stationed in many of the South Sea Islands during World War II, is a common and serious disease, though fortunately its chief sequela, elephantiasis, is rapidly decreasing in prevalence. Elephantiasis results from repeated exposure over a long period of time.

The parasite causing filariasis is *Wucheria bancrofti*. The vector is *Aedes polynesiensis* (until recently called *Aedes pseudoscutellaris*), which inhabits the bush only and has a very limited flight range, so that the disease is not contracted in the villages. Since, however, a staple food on the island is taro root, much of which is cultivated in the bush, the Samoans, particularly the men, are exposed.

A special filariasis clinic is held weekly at the hospital. Hetrazan is fairly effective against microfilaria, and courses of this therapy are given to patients and suspects. Surgery is sometimes necessary for the disfiguring end effects, especially for filarial hydrocele.

Control of the vector mosquitoes is difficult. Special attention to this problem is being given in Tahiti, where the disease is even more serious, by a research institute for tropical diseases under the leadership of Dr. John Kessel of the University of California at Los Angeles.

Tuberculosis is the second leading cause of

death and is the chief public health problem. Almost half the bed capacity of the hospital is used for the treatment of tuberculosis. An aggressive case-finding program was put into effect in the last 2 years, with routine chest films of all hospital admissions, a weekly chest clinic, and tuberculin testing of high school students and other groups.

As in many Pacific islands, tuberculosis became a veritable acute plague after its introduction in Samoa by Europeans more than a hundred years ago, with the coming of the first missionaries. The verbal traditions handed down from those days describe the severity of the epidemic.

Today, the Samoan seems to have traveled well along the road toward increased immunity. The acute forms of tuberculosis are now not often seen, except for tuberculous meningitis in young children. As in the continental United States, the usual forms found are the pulmonary exudative-fibrotic and fibro-caseo-cavitary varieties. Scrofula in children still occurs.

Minor collapse measures and antibiotic therapy were introduced by the Navy and intensified during the past 2 years. Thoracic surgery is a present lack, and the possibility of using a visiting thoracic surgeon should be further explored. Thoracoplasty and excisional surgery will help clear the beds now occupied by some who otherwise will not be able to be rid of their cavities and who therefore continue to be infectious.

The enthusiastic cooperation of the Samoan is of great value in the control of tuberculosis: He reports early for treatment of symptoms; he is cooperative and quite content to stay in the hospital until discharged.

In 1952 the death rate from tuberculosis among American Samoans was about 80 per 100,000. This figure is probably a minimum, for some, not many, undiagnosed tuberculosis deaths occur in the villages.

Young adults and young women especially are the most affected age and sex group. The current tuberculosis picture may be likened to that found in the United States 30 years ago. Although the resources of the hospital are being strained by the large number of cases of tuberculosis found in the last 2 years, the prospect of effective control in the near future is good.

In such a circumscribed area with little outside contact, except with Hawaii and Western Samoa, and with good control measures, one may hope for tuberculosis eradication.

Acute bacterial pneumonia occurs especially in young children beyond infancy. The infant at the breast has plenty of mother's milk in almost all cases; he is weaned late and then turned over to an older sibling for care, for the mother usually has another baby or household duties to care for. At this time the child's nutrition is poor, and intestinal parasites first attack the child. Whatever the reason, in this age group, bacterial pneumonias of hyperacute type and high mortality are common; the patients often enter the hospital in extremis after a very short illness. This problem involves nutrition, parasitic infestation, development of resistance, and probably other factors, such as physical exposure.

Tetanus, especially secondary to cuts from coral while swimming, is not uncommon, so immunization is given against it. Other immunizations have long kept the island free of smallpox and diphtheria. Meningococcic men-

ingitis is still seen, but not in epidemics. Pyogenic skin infection, especially in children, is common. Rheumatic heart disease and acute rheumatic fever in children are often found.

Psychoses are rare, and psychosomatic symptoms are either rare or rarely brought to medical attention. Occasional cases of hypertension, hyperthyroidism, and peptic ulcer occur. There is little suicide or homicide. The chief accidental death causes are drowning and falling from the tops of coconut trees.

The Samoan leads a calm, happy life, with not much work and great contentment, cradled all his life in the physical and psychological security of a village culture. If he could be rid of infectious diseases his health status would be among the world's best. The tremendous strides made since the introduction of Western medicine indicate that this is more than a visionary promise. The medical and public health machinery is in place, and operating; the cooperation and intelligence of the Samoan is high.

The prospect for a health paradise in the middle of the Pacific is good.

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## Public Health Education

With the aim of improving public understanding of the needs of the sightless, the municipal radio station of New York City, WNYC, broadcasts special programs provided by the American Foundation for the Blind.

WNYC has recently completed the broadcast of two series entitled, "The Torch Bearers" and "Man With a Question" and has scheduled a third, "There is No Night."

The station has broadcast a series of interviews also on the problems of the blind. These are called "Around New York."

During a civil defense exercise in New York—the Conelrad test involving all radio stations when some type of "spoken word" programming is essential—WNYC broadcast a talking book for the blind.

# Tuberculosis Case Finding in Iowa

By RALPH H. HEEREN, M.D., Ph.D., M.P.H., JOY HARMON, R.N., B.S., ALBERT P. ISKRANT, M.A., and JOSEPHINE GUTRIDGE, R.N.

IOWA has a low prevalence and a low incidence of tuberculosis. In 1952 the rate of new active cases reported was 19.1 (per 100,000 population), compared with an average of 55.0 for the continental United States. The mortality rate for tuberculosis was 6.8 (per 100,000 population), compared with 15.5 for the continental United States. The prevalence of active tuberculosis is correspondingly low.

While Iowa is proud of its low rates, the State is of necessity faced with the question of future tuberculosis control efforts. Among these problems is that of the case-finding program of the future—what will its pattern be?

Shall we continue the time-tested methods of contact investigation and long-term followup?

Shall we continue to attempt to X-ray periodically all our adult population, or shall we concentrate on segments of probably high prevalence based on location, occupation, income, or such factors?

What will be the role of tuberculin testing?

Shall we continue the tuberculin testing of school children and other young age groups and follow the associates of the positive reactors?

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Shall we extend tuberculin testing to include adult groups and X-ray the positive reactors?

To help us decide on a plan for the future we decided to study the past and current tuberculosis case-finding program in Iowa. We have analyzed the results of the current State program, and in addition we have attempted through retrospective study to determine how known cases were discovered. We shall report our study in two parts: We shall first present a summary of the current program, and second, an analysis of the reasons for coming to diagnosis of a group of tuberculosis patients.

## The Current Program

Three tuberculosis case-finding programs are currently carried on in Iowa, in which the Iowa State Department of Health participates jointly with the Iowa State Tuberculosis and Health Association and the county tuberculosis associations.

The largest of these case-finding programs, the countywide survey, is a mass X-ray survey program which has been carried out approximately once every 2 years in all counties in which the local health departments have no formal case-finding programs. Counties in which there are cities of more than 30,000 population, and in which tuberculosis case-finding programs are conducted as one of the health department programs, are included in the countywide survey programs by special request.

The second type of case-finding program, known as the contact program, is carried on primarily for the purpose of following known

cases of tuberculosis, their contacts, and also the tuberculosis suspects who have been referred to private physicians by the countywide survey and who have not as yet had decisions regarding the presence of active tuberculosis. The contact programs are scheduled, usually, to take place in counties in which countywide surveys were held the preceding year.

In addition to these two types of programs, X-ray surveys of special groups are carried on throughout the year. These are directed toward county homes and other institutions, to groups of food handlers, to industries, to colleges or other schools, and to small communities not covered by countywide surveys. In some instances the special program consists of 70-mm. film screening only, from which suspects are referred to private physicians for repeat X-rays. In other special groups, such as county homes and State and county institutions, suspects on the 70-mm. film are X-rayed again by the State health department units as is done in the countywide survey and the contact programs.

The 5 mobile units participating in these 3 programs are equipped to take both 70-mm. and 14" x 17" films. Three of the units are owned by the Iowa State Department of Health, and 2 are owned by the Iowa State Tuberculosis and Health Association.

### The Countywide Survey

The countywide survey generally consists of a large-scale appeal to people to accept an X-ray of the chest. An attempt is made to get an X-ray schedule into every home in the county, and, in addition, many persons are X-rayed at their place of work. School children, beginning with the seventh grade, are also included in this program. Persons who are positive to the 70-mm. X-ray are urged to return at a specified time for a 14" x 17" plate. All persons with suspected "tuberculous pathology" are referred to their physicians for confirmation of the diagnosis.

During 1952, surveys were held in 19 counties with an estimated total eligible (15 years and over) population of 293,327. Chest X-rays were performed for 222,441 (75.8 percent) persons. Of this number, 220,409 (99.1 percent)

**Table 1. Results of the countywide chest X-ray surveys, 19 Iowa counties, 1952**

Survey findings	Number	Percent
<i>Film data</i>		
Total 70-mm. films taken.....	222, 441	100. 0
Not recalled for 14" x 17" films.....	220, 409	99. 1
Recalled for 14" x 17" films <sup>1</sup> .....	2, 032	. 9
Total large films taken.....	1, 790	100. 0
Essentially negative.....	493	27. 5
Positive "pathology".....	1, 297	72. 5
Tuberculosis.....	384	21. 5
No tuberculosis.....	913	51. 0
<i>Referrals and confirmed diagnoses</i>		
Total tuberculosis suspects (14" x 17" films).....	384	100. 0
Reported before survey.....	96	25. 0
Primary complex <sup>2</sup> .....	35	9. 1
Referred for followup.....	253	65. 9
Tuberculosis diagnoses confirmed <sup>3</sup> .....	110	100. 0
Active.....	16	14. 5
Questionably active.....	12	10. 9
Inactive.....	77	70. 0
Activity not stated.....	5	4. 5

<sup>1</sup> 242, or 12 percent of 2,032, did not return.

<sup>2</sup> Not reportable.

<sup>3</sup> As of Oct. 1, 1953; represents 43.5 percent of 253.

were not recalled for a 14" x 17" film, and 2,032 (0.9 percent) were recalled for further examination (table 1).

This unusually low percentage of persons recalled for a large film may be partially explained by the fact that persons with readings of suspected nontuberculous chest diseases, with the exception of neoplasm, were not recalled for 14" x 17" films.

It was not considered necessary to recall for a large film those persons suspected from the reading of the 70-mm. film of having cardiovascular abnormalities and other conditions such as thoracic cage anomaly, lung anomaly, and abnormal diaphragm. Instead the film interpretation was reported by letter to the person's physician, and the individual was notified to see him for a report of the X-ray findings.

Of the 2,032 persons recalled for a 14" x 17" film, 1,790 received that type of X-ray, approximately one-fourth (493) were considered essentially negative, and one-fourth (384) as having tuberculosis (see table 1). The remainder, approximately 50 percent, were described as having findings other than tubercu-



losis—findings such as pneumonitis, possible neoplasm, emphysema, and hilar node calcification. Two hundred forty-two persons had confirmatory films taken privately, or did not live in the area, or had moved away.

Of the 384 persons who were considered tuberculosis suspects on the 14" x 17" film, 131 are described as previously known to the health department or not reportable (primary complex). The remaining 253, or approximately 1 per 1,000 persons examined, were referred to the physicians for followup and confirmation of diagnosis of tuberculosis. Among the replies from physicians and among the morbidity reports submitted by physicians, which were matched against the results of the X-ray, were 28 cases of active or questionably active tuberculosis which can definitely be ascribed to the survey as the case-finding mechanism. This is approximately 1 case per 8,000 persons examined.

Toward the end of 1952, queries were mailed from the State health department to physicians who had failed to report on cases referred to them from countywide and contact programs. Queries were sent on 281 cases; 125 answers were received as follows:

Seventy-five stated that patients had reported, were under physicians' care, but did not confirm the diagnosis of tuberculosis.

Ten confirmed the diagnosis.

Forty replied that the patients had not reported to them.

One hundred and fifty-one did not reply. Second letters were not sent to these persons. It appears likely that more cases of tuberculosis existed than were reported on by the physicians.

### The Contact Program

In preparation for a county contact program, records of reported cases or suspects in the county and all information regarding contacts of patients, including the results of previous X-ray readings, are sent by the State health department to the nurse who is to work in the county.

The nurse visits all physicians in the county and obtains their permission to call on cases, contacts, and suspects. She also asks the physician for the names of any persons on his patient

roster who may be suspected of having tuberculosis or for whom he feels an X-ray of the chest would be advisable. The X-ray in this program is a 14" x 17" film since it is considered more of a diagnostic procedure than a screening procedure.

Tuberculin testing of contacts and suspects before the survey is recommended, and the physician is supplied with sufficient tuberculin for this purpose. Some physicians prefer to have their patients receive the 14" x 17" X-ray without prior tuberculin testing.

The results of this program for 1952 are shown in table 2. A total of 2,234 persons received a large film. Of these, over half (53.3 percent) had positive readings; 714 were positive for nontuberculous pathology; and 477 were suspected of having tuberculosis. Most of these persons had previously been reported as having tuberculosis, and of those referred to physicians for diagnosis, 11 were reported as new active cases of tuberculosis.

### Special Group Surveys

Special X-ray programs in 1952 consisted only of the 70-mm. X-raying or screening phase. The names of persons with positive results at screening were referred to private physicians with recommendations for a large film. Records of the results of followup of suspects are not available.

In some programs, such as those conducted in county homes or in mental institutions, all persons with positive 70-mm. X-rays were re-

**Table 2. Results of contact followup program, 44 Iowa counties, 1952**

Results	Number	Percent
Persons receiving 14" x 17" films.....	2,234	100.0
Negative readings.....	1,043	46.7
Positive readings.....	1,191	53.3
No tuberculosis.....	714	31.8
Tuberculosis.....	477	21.4
Previously reported.....	320	
Primary complex.....	16	
Referred to physicians.....	141	
Diagnosis confirmed.....	61	
Active and questionably active.....	11	
Inactive.....	41	
Not stated.....	9	

called to have 14" x 17" films taken. In programs in which recall was included (county homes and the mental institutions), approximately 10 percent of those receiving 70-mm. X-rays were recalled to have the large films taken.

Two active cases of tuberculosis never previously known were discovered by this project. This is approximately 1 active case for each 1,500 70-mm. X-rays taken on persons in county homes and mental institutions. Undoubtedly, these 2 active cases are not the only ones discovered as a result of this survey since approximately only one-third of the 70-mm. films were subject to recall, two-thirds of the suspects had been referred to physicians on the basis of the 70-mm. X-ray, and no record of followup for these groups is available in the State health department.

Tuberculin testing of special groups has been developed and conducted as a special program in case finding. Entire school populations, usually limited to the seventh grade and over, have been tuberculin tested in some areas, and in other areas just selected grades have been tested. All those having positive reactions are X-rayed, and their associates are also examined for the presence of tuberculosis.

We see then that within the limits of reporting by physicians on the results of their follow-

up there were discovered through all these State programs at least 184 new cases of tuberculosis, of which 41 were active or questionably active. It is likely that some cases of tuberculosis diagnosed were not reported back by physicians, and among the 126 cases described as inactive, continued examination will show some to be active.

The 41 active cases may be considered the minimum accomplishment of the case-finding program. It is interesting that these 41 active cases are approximately 8 percent of all the cases of active tuberculosis reported in Iowa during 1952.

We may generalize that at least 8 percent of all the active tuberculosis discovered in the State of Iowa during 1952 was discovered as a result of these statewide case-finding efforts.

### Another Approach

Analyzing the reasons for coming to diagnosis is another way to examine our case-finding program and, of course, is a different approach from the one previously described.

In this analysis we start with the cases diagnosed as having tuberculosis or with the cases admitted to a sanatorium. Then through a retrospective study we attempt to find out what were the reasons which led to the diagnosis of

**Table 3. Reason for coming to diagnosis—patients admitted to Oakdale Sanatorium, Iowa, with active tuberculosis, 1952**

Stage on admission	Symptoms		Contact investigation		X-ray survey		Hospital admission X-ray		X-ray by nurse		Followup of inactive tuberculosis		Other		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Minimal.....	3	30	3	30	1	10	0	0	2	20	1	10	0	0	10	100
Moderately advanced.....	25	51	5	10	8	17	4	8	1	2	4	8	1	2	48	100
Far advanced.....	101	88	4	3	3	3	2	2	0	0	1	1	4	3	115	100
Total active tuberculosis (including 3 "other").....	131	74	12	7	13	7	6	3	3	2	6	3	5	3	176	100
Percent far advanced.....		77		33		23		33		0		17		80		65
Mean age.....	46		26		41		55		28		46		44		44	

tuberculosis. In a way we are trying to discover motivation; that is, what is the underlying cause that gave rise to the chain of events that led to the person presenting himself to a physician or to an X-ray survey to find out if he had tuberculosis.

Data for the cases of tuberculosis admitted to the State sanatorium at Oakdale, Iowa, during the calendar year 1952 are presented in table 3. There were 176 of these cases; 10 were minimal; 48, moderately advanced; and 115, far advanced. We had already noted from the data released by the Public Health Service that the proportion of far advanced tuberculosis is higher for Iowa (52.7 percent) than for any State in the United States (1).

In our study we included factors which would help us to find out why such a large proportion of the new cases in Iowa are in the far advanced stage.

It will be noted that 74 percent of the cases admitted to Oakdale Sanatorium are described as having been discovered because of the person's own index of suspicion. This means that these people presented themselves to physicians for diagnosis because of symptoms which are ordinarily associated with tuberculosis. Contact investigation was the underlying reason for 7 percent, and a similar percentage came to diagnosis because of X-ray surveys.

It is perhaps worth noting that whereas analysis of the Oakdale figures shows that 7 percent of the admissions in 1952 were diagnosed because of X-ray surveys, our previous study showed that 28 cases of active tuberculosis were reported as being discovered in Iowa during 1952 because of the mass X-ray survey (approximately 8 percent of all the cases reported in Iowa). Thus, we note that both analyses tend to give the same result: Between 7 and 8 percent of all the active tuberculosis diagnosed in Iowa is diagnosed because of mass X-ray surveys.

It is also interesting that routine X-raying of all admissions to a general hospital produced 3 percent of the tuberculosis, examination of nurses produced 2 percent, and followup of inactive cases of tuberculosis produced 3 percent.

Of all the cases coming to diagnosis because of symptoms, 77 percent were in the far advanced stage. It is also of significance that

for other designated methods of case finding the proportion in the far advanced stage was never higher than one-third. This means that when we go out and aggressively look for tuberculosis among people who are not symptomatic and who are not going to their physician because of symptoms, two-thirds of the tuberculosis discovered is in a stage prior to far advanced.

We may also wish to consider the age of persons found by these various methods. It will be noted that, except for those found through hospital admission X-ray, the persons motivated by symptoms were the oldest, and those found through contact investigation and followup of student nurses were the youngest. Nevertheless, comparison with the rest of the United States shows that the tuberculosis patients reported in Iowa are not older than the average for the continental United States, according to the Public Health Service (1).

In the United States in 1952, more than 12 percent of the tuberculosis patients reported were of age 65 and over. In Iowa, less than 10 percent were in that age group. Other age groups show no great differences except that in Iowa a slightly smaller percentage of the tuberculosis patients reported was under 5 years of age than in the United States (1.0 versus 3.1).

Here, then, is a partial answer to our question as to why Iowa, with its low morbidity and mortality rate, has such a large proportion of its cases diagnosed in the far advanced stage. Three-quarters of all the cases of tuberculosis diagnosed in Iowa, as judged by the admissions to Oakdale Sanatorium, have come to diagnosis because of symptoms associated with tuberculosis. In other words, their tuberculosis has progressed to a stage where their symptoms are sufficient to arouse suspicion of tuberculosis or at least to motivate them to go to their physician to find out what ails them.

#### Indicators for the Future

What then can Iowa do about this large proportion of cases in the far advanced stage?

In what direction shall our case-finding program of the future be?

In view of the fact that 3 out of 4 patients come to diagnosis because of symptoms, shall we discontinue organized case finding and rely on



people to go to their physician when they are sick?

The answer to the last question is "No."

In Iowa, during 1952, 506 cases of active tuberculosis were reported; if the Oakdale distribution can be applied to these cases, we can say that 26 percent, or 132 cases of active tuberculosis, was found through organized case finding by health department effort. We can assume that most or all of these were benefited by early case finding and that, in addition, the community gained by taking out of circulation so many cases of infectious disease. Our problem is how to keep on removing from their environment this proportion of active cases, or a larger proportion, and to do it as early as possible.

Our case-finding programs of the future then would seem to be:

- ▶ Continued intelligent followup with periodic examination of all suspects and known inactive cases with special reference to cases referred to private physicians.
- ▶ Realistic followup and periodic examination of all contacts of active cases of tuberculosis.
- ▶ Expansion of routine X-raying on admission to hospitals and other institutions.
- ▶ Admission and periodic X-raying of inmates of mental sanatoriums, prisons, and other institutions for long-term care.
- ▶ Continued X-ray surveys of groups and areas of presumably high prevalence, such as the aged, transients, food handlers, overcrowded areas of our cities, and so forth.
- ▶ Preemployment X-raying and periodic examination of industrial groups and others who can have X-ray facilities made readily available.
- ▶ Continued tuberculin testing of students with X-ray of the positives and examination of contacts and associates.

Tuberculin testing of whole communities on an experimental basis with X-raying of all positive reactors would appear to be indicated.

Experience in a few areas would give us valuable information both from an administrative and epidemiological point of view regarding the merit of this method as a case-finding procedure.

### Summary

Two studies were made to evaluate tuberculosis case-finding procedures in Iowa.

One study shows that during 1952 at least 184 cases of tuberculosis, 41 of them active or questionably active, were found by the statewide program of the State department of health; these were found chiefly through X-raying. This number is approximately 8 percent of the active tuberculosis reported in Iowa in that year.

Another study of the reason for coming to diagnosis shows that approximately 75 percent of all cases of tuberculosis diagnosed in 1952 came to diagnosis because of symptoms related to tuberculosis. X-raying of the public produced 7 percent; contact investigation, 7 percent; and the remainder were found through followup of inactive tuberculosis, X-raying of hospital admissions and staff, and so forth.

Some of the possible reasons for such a large proportion being diagnosed because of symptoms are discussed, and the case-finding program for the future is proposed.

### ACKNOWLEDGMENT

Acknowledgment is made to Dr. W. M. Spear, medical director of the Iowa State Sanatorium at Oakdale, for his cooperation in making available for analysis the records of admissions during 1952.

### REFERENCE

- (1) U. S. Public Health Service: Reported tuberculosis morbidity and other data, calendar year 1952. Washington, D. C., The Service, 1953, 17 pp. Not available for distribution.



*A new medical statement, issued by the American Heart Association's Council on Rheumatic Fever and Congenital Heart Disease, gives current preventive measures. Prepared by the council's Committee on Prevention of Rheumatic Fever and Bacterial Endocarditis, the statement was first published in "Circulation," February 1955, and has had special distribution as part of the "Stop Rheumatic Fever" campaign.*

## Rheumatic Fever Prevention

A new statement on the prevention of rheumatic fever and bacterial endocarditis, issued in January by the American Heart Association, incorporates the important advances made in the field during the past 2 years.

The statement, a revision of the January 1953 report, presents techniques for treating and preventing streptococcal infections to forestall both initial rheumatic fever attacks and recurrences. It also recommends measures for preventing bacterial endocarditis, an occasional aftermath of rheumatic fever.

Among the new developments is the emphasis on eradication of streptococcal infections from the throat by full doses of penicillin. Recommended for the first time are intramuscular injections of long-acting benzathine penicillin G. In the long-term prevention of rheumatic fever recurrences, one tablet of penicillin a day has been found adequate.

With the issuance of the revised statement, the Public Health Service and the American

Heart Association are planning a cooperative campaign, starting this spring, to help communities establish rheumatic fever prevention programs, aimed at eventual eradication of this disease. A new film, booklet, and other education material have been prepared for distribution to the general public through local heart associations and health departments in the "Stop Rheumatic Fever" campaign.

Although the number of rheumatic fever deaths has been declining, some 1,500 children and young persons under 25 years of age and more than 19,000 others above age 25 died of rheumatic fever and rheumatic heart disease in 1953. Many thousands of new cases of rheumatic fever occur each year, and there are many more thousands of "old" cases.

Following is the revised statement entitled "Prevention of Rheumatic Fever and Bacterial Endocarditis Through Control of Streptococcal Infections."

### Treatment of Streptococcal Infections in the General Population

In the general population about 3 percent of untreated streptococcal infections are followed by rheumatic fever. Adequate and early penicillin treatment, however, will eliminate streptococci from the throat and prevent most attacks of rheumatic fever.

#### Diagnosis of Streptococcal Infection

In many instances streptococcal infections can be recognized by their clinical manifestations.

In some patients, however, it is difficult or impossible to determine the streptococcal nature of a respiratory infection without obtaining throat cultures. The following section on diagnosis has been included in order to reduce diagnostic errors and to assist physicians in avoiding unnecessary therapy.

The accurate recognition of individual streptococcal infections, their adequate treatment, and the control of epidemics in the community

presently offer the best means of preventing initial and recurrent rheumatic fever.

### COMMON SYMPTOMS

**Sore throat**—sudden onset, pain on swallowing.

**Headache**—common.

**Fever**—variable, but generally from 101° to 104° F.

**Abdominal pain**—common, especially in children; less common in adults.

**Nausea and vomiting**—common, especially in children.

### COMMON SIGNS

**Red throat.**

**Exudate**—usually present.

**Glands**—swollen, tender lymph nodes at angle of jaw.

**Rash**—scarlatiniform.

**Acute otitis media** } frequently due to

**Acute sinusitis** } the streptococcus.

In the absence of the common symptoms and signs, occurrence of any of the following symptoms is usually not associated with a streptococcal infection: simple coryza, hoarseness, cough.

### LABORATORY FINDINGS

**White blood count**—generally over 12,000.

**Throat culture**—positive culture for hemolytic streptococci is almost always diagnostic.

### Treatment of Streptococcal Infections

When streptococcal infection is suspected, treatment should be started immediately. Penicillin is the drug of choice. Effective blood levels should be maintained for a period of 10 days to prevent rheumatic fever by eradicating the streptococci from the throat.

Penicillin may be administered by either intramuscular or oral route. Intramuscular ad-

ministration is recommended as the method of choice since it insures adequate treatment. Oral therapy by contrast is dependent upon the cooperation of the patient. On the other hand, some physicians and patients prefer repeated oral medication and object to injections.

### Recommended Treatment Schedules

#### INTRAMUSCULAR PENICILLIN

##### Benzathine Penicillin G

*Children*—one intramuscular injection of 600,000 units.

*Adults*—one intramuscular injection of 600,000 to 900,000 units.

**or Procaine Penicillin** with aluminum monostearate in oil.

*Children*—one intramuscular injection of 300,000 units every third day for 3 doses.

*Adults*—one intramuscular injection of 600,000 units every third day for 3 doses.

#### ORAL PENICILLIN

*Children and adults*—250,000 units 3 times a day for a full 10 days.

To prevent rheumatic fever by eradicating streptococci, therapy must be continued for the entire 10 days even though the temperature returns to normal and the patient is asymptomatic.

#### OTHER MEDICATION

It has not been established that the broad spectrum antibiotics are as effective as penicillin in preventing rheumatic fever. They should be used only if the patient is sensitive to penicillin. As with penicillin, the regimen of full therapeutic dosage for a full 10 days should be followed.

The following therapy is not effective in preventing rheumatic fever when used as treatment for streptococcal infections: sulfonamide drugs, penicillin troches or lozenges.

### Prevention of Streptococcal Infections in Rheumatic Individuals

Many streptococcal infections occur without producing clinical manifestations. For this reason, prevention of recurrent rheumatic fever

must depend on continuous prophylaxis rather than solely on treatment of acute attacks of streptococcal disease.

## General Rules for Prophylaxis

### Who should be treated?

All individuals who have a well established history of a previous attack of rheumatic fever or chorea or who show definite evidence of rheumatic heart disease should be placed on continuous prophylaxis.

### When should prophylactic treatment be initiated?

*Active rheumatic fever*—As soon as the diagnosis of rheumatic fever is made or any time thereafter when the patient is first seen. The streptococcus should be eradicated with penicillin (see Treatment Schedules) following which the prophylactic regimen is instituted.

*Inactive rheumatic fever*—In inactive rheumatic fever, prophylaxis should be instituted when the patient is first seen.

### How long should prophylaxis be continued?

Throughout life, or until new knowledge makes this recommendation invalid.

### Should prophylaxis be continued during the summer?

Yes, continuously. Streptococcal infections can occur at any season although they are more prevalent in the winter.

### What are the exceptions to continuous prophylaxis?

Uncertainty as to the validity of a history of a previous attack of rheumatic fever or chorea.

Heart disease of questionable etiology.

In rare circumstances where exposure of the adult patient to streptococcal infection is unlikely.

### Prophylactic Methods—Oral and Intramuscular

Oral medication depends on patient cooperation. In most instances failures of sulfonamide or penicillin prophylaxis occur in patients who fail to ingest the drug regularly. This can be avoided by long-acting depot penicillin given intramuscularly once a month.

## SULFADIAZINE—ORAL

This drug has the advantage of being easy to administer, inexpensive and effective (other newer sulfonamides are probably as effective). Although resistant streptococci have appeared during mass prophylaxis in the armed forces, this is rare in civilian populations.

*Dosage*—from 0.5 to 1.0 gm. taken each morning throughout the year. The smaller dose is to be used in children under 60 pounds.

*Toxic reactions*—infrequent and usually minor. In any patient being given sulfonamides, consider all rashes and sore throats as possible toxic reactions especially if they occur in the first 8 weeks. In patients on this prophylactic regimen it is hazardous to treat toxic reactions or intercurrent infections with sulfonamides. The chief toxic reactions are:

*Skin eruptions*: Morbilliform—continue drug with caution. Urticaria or scarlatiniform rash associated with sore throat or fever—discontinue drug.

*Leukopenia*: Discontinue if white blood count falls below 4,000 and polynuclear neutrophils below 35 percent because of possible agranulocytosis which is often associated with sore throat and a rash. Because of these reactions, weekly white blood counts are advisable for the first 2 months of prophylaxis. The occurrence of agranulocytosis after 8 weeks of continuous prophylaxis with sulfonamides is extremely rare.

## PENICILLIN—ORAL

Penicillin has the desirable characteristics of being bactericidal for hemolytic streptococci and of rarely producing serious toxic reactions. A careful history of allergic reactions and previous response to penicillin should be obtained.

*Dosage*—200,000 to 250,000 units once a day, before breakfast.

### Toxic reactions:

*Urticaria and angioneurotic edema.*

*Reactions similar to serum sickness*—includes fever and joint pains and may be mistaken for rheumatic fever.

Although many individuals who have had reactions to penicillin may subsequently be able to tolerate the drug, it is safer not to use penicillin if the reaction has been severe and particularly if angioneurotic edema has occurred.

#### **BENZATHINE PENICILLIN G INTRAMUSCULAR**

*Dosage*—1,200,000 units once a month.

*Toxic reactions*—same types as with oral penicillin but occur more frequently and tend to be more severe. Some local discomfort usually experienced.

### **Protection of Rheumatic Fever Patients in Hospital Wards**

Patients with rheumatic fever or rheumatic heart disease are often exposed to increased hazards in hospital wards as the result of contact with streptococcal carriers or patients with active streptococcal infections. Protection of the rheumatic patient is imperative because of the high rate of recurrence of rheumatic fever following streptococcal infection. In addition to the customary precautions employed to prevent cross infections, the following procedures are recommended:

All hospital patients with streptococcal infections should be fully treated by one of the methods outlined in Recommended Treatment Schedules in order to eliminate streptococci and avoid the carrier state.

Patients admitted with acute rheumatic fever should immediately receive a full course of antibiotic therapy, whether or not streptococci are isolated from the throat (see Recommended Treatment Schedules). As soon as the therapeutic course is completed, continuous streptococcal prophylaxis should be instituted (see Prophylactic Methods—Oral and Intramuscular).

Patients with inactive rheumatic fever or rheumatic heart disease should be placed on continuous streptococcal prophylaxis on admission to the hospital or as soon thereafter as the diagnosis is established (see Prophylactic Methods—Oral and Intramuscular).

### **Prophylaxis Against Bacterial Endocarditis**

In individuals who have rheumatic or congenital heart disease, bacteria may lodge on the heart valves or other parts of the endocardium, producing bacterial endocarditis. Transient bacteremia which may lead to bacterial endocarditis is known to occur following various operative procedures including dental extractions and other dental manipulations which disturb the gums, the removal of tonsils and adenoids, the delivery of pregnant women, and operations on the gastrointestinal or urinary tracts. It is good medical and dental practice to protect patients with rheumatic or congenital heart disease by prophylactic measures.

#### **Recommended Prophylactic Methods**

Penicillin is the drug of choice for administration to patients with rheumatic or congenital heart disease undergoing dental manipulations, or operative procedures in the oral cavity.

Although the exact dosage and duration of therapy are somewhat empirical, there is some evidence that for effective therapeutic prophylaxis reasonably high concentrations of penicillin must be present at the time of the operative procedure. The dosage regimens employed for long-term prophylaxis of rheumatic fever are inadequate for this purpose. There is reason to believe that continuous maintenance of penicillin in the blood over a period of several days will result in the death of those organisms which have lodged in the heart valve during the period of transient bacteremia.

Not only should penicillin prophylaxis be designed to afford maximum protection, but the method must also be practical. In general, the parenteral route of administration is preferred. All patients should be instructed to report to their physician or clinic should they develop a fever within a month following the operation.



### INTRAMUSCULAR PENICILLIN

*Dosage*—600,000 units of aqueous penicillin and 600,000 units of procaine penicillin in oil containing 2 percent aluminum monostearate administered intramuscularly 30 minutes before the operative procedure.

### ORAL PENICILLIN

As an alternative, although considered less desirable, penicillin may be administered by the oral route.

*Dosage*—250,000 to 500,000 units one-half hour before each meal and at bedtime, beginning 24 hours prior to the operation and continuing for 5 days. At the time of the operative pro-

cedure it is advisable to give an additional 250,000 units.

*Contraindications*—Patients who give a history of sensitivity to penicillin.

### OTHER ANTIBIOTICS

The broad spectrum antibiotics should be employed as prophylaxis in patients who are sensitive to penicillin or in those who are undergoing surgery of the urinary or lower gastrointestinal tract. Oxytetracycline, chlortetracycline, or erythromycin should be administered in full dosage for 5 days, beginning treatment the day prior to the surgical procedure.

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### Public Education Materials

Education materials for the general public on rheumatic fever prevention include:

A 12½-minute, 16-mm. film, entitled "Stop Rheumatic Fever," produced by Transfilm, Inc., for the National Heart Institute with the cooperation of the American Heart Association.

A new booklet for adults, "Stop Rheumatic Fever," summarizing the film content and illustrated with stills from the film. The booklet tells about streptococcal infections and what to do about them to prevent rheumatic fever and rheumatic heart disease.

A discussion guide to aid users of the film and

other educational material in arranging programs for parents, teachers, and community health meetings.

A pamphlet, entitled "Now You Can Protect Your Child Against Rheumatic Fever," which features a chart advising on "when to call the doctor and what to tell him about your child's sore throat."

A question-and-answer leaflet presenting background information on rheumatic fever.

These materials are available from local heart associations and health departments as well as from the American Heart Association, 44 East 23d Street, New York 10, N. Y., and the Heart Information Center, National Heart Institute, Public Health Service, Bethesda 14, Md.

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## PHS films

### Infective Larvae of *Ancylostoma caninum*

16 mm., sound, black and white, 4 minutes, 157 feet. 1954.

**Audience:** Parasitologists, students of parasitology and biology, and others interested in the study of intestinal parasites.

**Available:** Loan—Public Health Service, Communicable Disease Center, 50 7th St., NE., Atlanta 5, Ga. Purchase—United World Films, Inc., 1445 Park Ave., New York 29, N. Y.

Infective larvae of the dog hookworm is the subject of this motion picture, which has been filmed especially for parasitologists and students of parasitology and biology. It shows the migration upward from beneath the surface of the soil of large numbers of infective hookworm larvae. Another phase of the larva behavior pictured is the vertical position assumed on soil particles, either singly or in tufts composed of dozens of worms.

### *Ancylostoma caninum* in the Intestine of the Dog

16 mm., sound, black and white, 5 minutes, 184 feet. 1954.

**Audience:** Parasitologists, students of parasitology and biology, and others interested in the study of intestinal parasites.

**Available:** Loan—Public Health Service, Communicable Disease Center, 50 7th St., NE., Atlanta 5, Ga. Purchase—United World Films, Inc., 1445 Park Ave., New York 29, N. Y.

Bloodsucking activities and copulation of adult hookworms in the intestine of the dog are featured in this motion picture. The hookworm species *Ancylostoma caninum* is used in the demonstration. Characteristics of the parasite shown are the large numbers of living hookworms



***Ancylostoma caninum* in the  
intestine of the dog**

able to attach themselves to the intestinal mucosa; the worms ingesting blood and eliminating it from their posterior end; and the continued feeding of the parasites while the male and female are in copula. The amount of blood lost by the host through the feeding of a single worm is an interesting depiction.

### An Outbreak of *Salmonella* Infection

16 mm., sound, black and white, 13 minutes, 481 feet. 1954.

**Audience:** Pathologists, nutritionists, dietitians, sanitarians, and others interested in foodborne disease control.

**Available:** Loan—Public Health Service, Communicable Disease Center, 50 7th St., NE., Atlanta 5, Ga. Purchase—United World Films, Inc., 1445 Park Ave., New York 29, N. Y.

A simulated case study of foodborne illness is used in this motion picture to illustrate to viewers the problems caused by an outbreak of foodborne infection. Organisms of the *Salmonella* group have been chosen for this demonstration of typical food contaminants.

The film depicts the sources of *Salmonella* organisms; factors contributing to the survival and transfer of the organisms; and ways in which contamination may occur. It describes an illness outbreak in terms of persons exposed to and susceptible to the infection. Recommended

methods for sanitary food handling under ordinary circumstances are shown.

### Transmission of Anthrax— Animal to Man

35 mm. filmstrip, sound, color, 12 minutes, 70 frames. 1954.

**Audience:** Pathologists, physicians, medical students, and others interested in disease transmission control.

**Available:** Loan—Public Health Service, Communicable Disease Center, 50 7th St., NE., Atlanta 5, Ga. Purchase—United World Films, Inc., 1445 Park Ave., New York 29, N. Y.

Using both artists' sketches and clinical photographs, this filmstrip traces the history of anthrax from the time of the Pharaohs to the present, emphasizing particularly the work of Chabert, Koch, and Pasteur. It shows how anthrax spores are brought into the United States on imported animal products such as wool, hair, and hides; and how human anthrax infection generally can be traced to diseased cattle, sheep, or swine in rural areas and to animal products used by industry.



**A healing anthrax lesion**

The appearance of anthrax lesions and response to clinical treatment are demonstrated in pictures of several cases of human anthrax.

On maps is shown the distribution in the United States of human and of animal anthrax during 1953; and on a bar chart is indicated the number of reported cases of human anthrax in the United States for the years 1944 to 1953.

*An important new development in the serodiagnosis of syphilis is the demonstration of at least two Treponema pallidum agglutinating antibodies in syphilitic serums.*

## Agglutination of *Treponema pallidum* by Reagin Antibody

By CHARLOTTE P. McLEOD, Sc.D., and PEGGIE S. STOKES, A.B.

**S**PECIFIC AGGLUTINATION of killed *Treponema pallidum* has been demonstrated by several investigators (1-3). Recently, McLeod and Magnuson (4) showed that agglutination of *T. pallidum* in syphilitic serum was greatly enhanced by the conglutinating action (5) of fresh steer serum. A preliminary evaluation (4) of this technique as a diagnostic test for syphilis indicated that the comparatively simple agglutination test might be as sensitive and specific as the *T. pallidum* immobilization (TPI) test (6). Subsequent experiments, however, have made clear that the agglutination test in its present form detects more than one antibody and is in part a measure of reagin. These investigations, together with

a study of certain factors which influence the sensitivity of the test, are the subject of the present paper.

### Methods

The methods used were similar to those earlier described in detail (4). Spirochetes were extracted in saline from testicular lesions of rabbits inoculated 7 to 10 days earlier with the Nichols strain of *T. pallidum*. The organisms were sedimented by centrifugation, resuspended in fresh saline, and the suspensions adjusted to contain approximately 60 to 75 spirochetes per high-power field. In order to insure even distribution of the organisms, bovine albumin fraction V was added in a final concentration of 5 percent. The antigens were then heated at 56° C., unless otherwise stated, and stored at -20° C.

Serum samples to be tested were similarly stored at -20° C. Steer serum was stored in a CO<sub>2</sub> chest at -76° C. and was not thawed until immediately before use. The same lot of steer serum was employed in all experiments. It was titered for natural agglutinins against each new antigen, and the lowest dilution which did not agglutinate the spirochetes was used in the test (1:7 to 1:15 dilution).

In performing the tests, the antigen was pre-

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*Dr. McLeod is a bacteriologist and Mrs. Stokes is a research assistant with the Venereal Disease Experimental Laboratory, Public Health Service, at the School of Public Health, University of North Carolina, Chapel Hill, N. C.*

*Results of the TPI tests were supplied by George Cannefax, who is also with the Venereal Disease Experimental Laboratory.*

*This paper was presented at the Symposium on Recent Advances in the Study of Venereal Diseases, Washington, D. C., April 29, 1954.*

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**Table 1. Effect of absorptions with VDRL antigen on the agglutinating titer of syphilitic serum**

Added to tests	Agglutinating titers <sup>1</sup>			
	Control pool B (VDRL 1:32)		Absorbed pool B (VDRL negative)	
	10 minutes	2 hours	10 minutes	2 hours
Saline--- Steer serum.	Negative-- 1:80-----	1:40 1:160	Negative-- Undiluted--	Undiluted. 1:40.

<sup>1</sup> Antigen heated at 56° C. for 40 minutes.

sensitized by the antibody before adding the steer serum, and parallel tests were run without steer serum. One-tenth cubic centimeter of antigen was mixed with 0.1 cc. of test serum or dilution in Wassermann tubes and the mixtures were shaken for either 2 or 23 hours. One-tenth centimeter of steer serum or saline was then added and the tubes were shaken for an additional 10 minutes. The tests were shaken on a standard Kahn shaker, or on a much less vigorous shaker with a rotary motion (250 revolutions per minute, 1-inch diameter). The tests were incubated either at room temperature (21° to 24° C.) or in an incubator at 33° to 35° C. Although agglutination occurred more rapidly on the Kahn shaker, the titers obtained in 2 hours on the positive control syphilitic serum pool B were similar on both shakers and were unaffected by the temperature of incubation. The method of reading the tests has been described (4). In the present study, titers are expressed as the lowest dilution which showed strongly positive agglutination (3+ to 4+).

Nonsyphilitic serum containing reagin antibody was produced by the method of Eagle (7) in normal rabbits whose serum initially showed negative VDRL (8) and agglutination tests. The animals were injected with saline suspensions of washed lipoidal antigen-antibody precipitate obtained by absorbing human syphilitic serum with VDRL antigen. (Twenty-five cubic centimeters of serum, VDRL titer 1:8, were absorbed once with the washed sediment from 125 cc. of antigen. Thirty cubic centimeters of serum, VDRL titer 1:64, were

absorbed three times with sediment from a total of 525 cc. of antigen.) Each dose was contained in a volume of 5 cc. Five rabbits were inoculated intraperitoneally with 5 doses each during a period of 13 days and were bled on the day following the last injection.

## Results

A first experiment showed the presence of at least two agglutinating antibodies in syphilitic serum. A portion of human syphilitic serum pool B, which contained both reagin and TPI antibodies, was absorbed with VDRL antigen until a negative VDRL slide test was obtained. The agglutination titers of the control serum and of the reagin-absorbed serum were then compared in a test with antigen which had been heated at 56° C. for 40 minutes. The tests were read after incubation periods of 10 minutes and 2 hours.

The results, shown in table 1, indicate that a part of the agglutinating activity of pool B was due to the presence of reagin. This is shown most clearly at 10 minutes in the test with steer serum, and at 2 hours in the test without steer serum. In the test with steer serum, control pool B (VDRL 1:32) showed an agglutination titer of 1:80 at 10 minutes whereas absorbed pool B (VDRL negative) agglutinated only when undiluted. In the 2-hour test without steer serum, the titer of pool B was 1:40, whereas absorbed pool B agglutinated only when undiluted. The presence of another agglutinating antibody, not identical with reagin, was demonstrated in absorbed pool B in the test with steer serum. The absorbed serum contained no meas-

**Table 2. Effect of immunizing rabbits with VDRL antigen-antibody precipitate**

Rabbit No.	VDRL titer	Agglutinating titer <sup>1</sup> (with steer serum)	TPI titer
4744-----	1:128	1:160-----	Negative.
4756-----	1:64	1:80-----	Do.
4755-----	1:64	1:40-----	Do.
4746-----	1:32	Undiluted---	Do.
4754-----	1:32	-----do-----	Do.

<sup>1</sup> Antigen heated at 56° C. for 40 minutes. Tests read at 2 hours.



**Table 3. Effect of incubation time on agglutinating titers of syphilitic serum and nonsyphilitic reagin serum**

Added to tests	Agglutinating titers <sup>1</sup>					
	Control pool B (VDRL 1:32)		Absorbed pool B (VDRL negative)		Nonsyphilitic reagin serum (VDRL 1:64)	
	2 hours	23 hours	2 hours	23 hours	2 hours	23 hours
Saline.....	1:20	1:80	Undiluted.....	1:20	1:10	1:10
Steer serum.....	1:320	1:320	1:40.....	1:160	1:10	1:10

<sup>1</sup> Antigen heated at 56° C. for 40 minutes.

urable reagin but had an agglutination titer of 1:40 at 2 hours.

In a second experiment it was shown that *T. pallidum* was agglutinated by reagin antibody in nonsyphilitic serum. Five normal rabbits were immunized with lipoidal antigen-antibody precipitate as described under "Methods," and the serum from these animals was tested for the presence of reagin, agglutinating, and TPI antibodies. The agglutination tests were run with steer serum, using antigen heated at 56° C. for 40 minutes, and were read at 2 hours. The titers obtained in the three tests are shown in table 2. All of the serums gave positive VDRL and agglutination tests but negative TPI tests. The VDRL titers ranged from 1:32 to 1:128, and the agglutinating titers ranged from undiluted to 1:160. Three rabbits were high in both VDRL and agglutinating titers. In the two rabbits with low titers, the VDRL test appeared to be a more sensitive test for reagin than the agglutination test.

A study was next made of the effect of the length of the incubation period on the agglutinating titer. The serum samples from the five rabbits immunized with VDRL antigen-antibody precipitate were pooled and designated "nonsyphilitic reagin serum." Agglutination tests were run on this serum, which contained only reagin antibody; on pool B, which contained reagin and at least one additional antibody; and on absorbed pool B, from which the reagin antibody had been removed. The tests were run with antigen which had been heated at 56° C. for 40 minutes and were read after incubation periods of 2 and 23 hours. The results are shown in table 3.

The nonsyphilitic reagin serum (VDRL 1:64) showed no rise in titer on prolonging the incubation period from 2 to 23 hours. In the test with steer serum, pool B (VDRL 1:32) also showed no rise in titer after 2 hours. On the other hand, absorbed pool B (VDRL negative) showed a fourfold rise in titer between 2 and 23 hours. This slow rise in titer of the second antibody apparently was masked, or partially masked, in control pool B by the rapid agglutinating action of the reagin antibody. The addition of steer serum caused no rise in the titer of the nonsyphilitic reagin serum either at 2 or at 23 hours. In both the control and the absorbed pool B, the addition of steer serum caused a rise in titer at 23 as well as at 2 hours.

The effect of heat on the sensitivity and specificity of the antigen was investigated. In preparing the antigens for these studies, aliquot portions of the same spirochete suspension were used. One portion was not heated; a second portion was heated at 56° C. for 40 minutes, and a third portion was heated at 100° C. for 40 minutes.

The sensitivity of these antigens was tested in a first experiment with control pool B and with pool B which had been absorbed with VDRL antigen; and in a second experiment, with the nonsyphilitic reagin serum. The tests were read after an incubation period of 2 hours, with results which are illustrated in table 4. The titers of each of the three serums increased both with and without steer serum as the antigens were heated. Heating the antigen at 100° C. increased its sensitivity to the reagin antibody, as shown by the titers of the nonsyphilitic

**Table 4. Effect of heat on agglutinability of antigen in syphilitic serum and in nonsyphilitic reagin serum**

Serum tested	Added to tests	Agglutinating titers at 2 hours		
		Antigen not heated	Antigen heated, 56° C., 40 minutes	Antigen heated, 100° C., 40 minutes
Experiment 1:				
Pool B (control) -----	Saline -----	1:10 -----	1:40 -----	1:160
	Steer serum -----	1:20 -----	1:320 -----	1:1,280
Pool B (absorbed) -----	Saline -----	Undiluted (3+) -----	Undiluted (4+) -----	1:10
	Steer serum -----	Undiluted (4+) -----	1:80 -----	1:320
Experiment 2:				
Nonsyphilitic reagin serum -----	Saline -----	Negative -----	1:20 -----	1:40
	Steer serum -----	do -----	1:20 -----	1:320

reagin serum, and to the second antibody as shown by the titers of the reagin absorbed syphilitic serum. Heating the antigen at 100° C. also markedly increased its sensitivity to the conglutinating action of steer serum. This is shown most clearly in the tests with the non-syphilitic reagin serum. The addition of steer serum caused no rise in titer with the antigen heated at 56° C., but caused an eightfold rise with antigen heated at 100° C.

In testing the effect of heat on the specificity of the antigen, agglutination tests were run on serum samples from 19 individuals with negative VDRL and TPI tests (medical students and laboratory personnel). The undiluted serum from each donor was tested both with and without steer serum against antigen heated at 56° C. for 40 minutes and against antigen heated at 100° C. for 40 minutes. The tests with antigen heated at 56° C. were read after incubation periods of both 2 and 23 hours. The tests with antigen heated at 100° C. were read at 23 hours. Since approximately the same findings were obtained on each serum both with and without steer serum, the results of the two techniques have not been tabulated separately. The numbers of serums showing positive or negative agglutination with each antigen are listed in table 5.

With antigen heated at 56° C., 18 of the 19 normal serums were negative at 2 hours and 1 was weakly positive (1+). At 23 hours, 7 serums remained negative, and 12 were weakly

positive. With antigen heated at 100° C., only 1 serum was negative at 23 hours. Of the 18 samples showing agglutination, 3 were weakly positive (2+) and 15 gave strongly positive reactions (3+ to 4+).

#### Discussion

The experiments show that the utilization of the agglutination technique as a diagnostic test for syphilis must await the preparation of more specific antigens. The test with heat-killed spirochetes measured at least two different antibodies in syphilitic serum. One antibody

**Table 5. Effect of heat on agglutinability of antigen in undiluted normal human serum**

Agglutination test procedure	Total serums tested <sup>1</sup> (TPI negative, VDRL negative)	Results of agglutination test		
		Negative	1+, 2+	3+, 4+
Antigen heated at 56° C.:				
Incubated 2 hours---	19	18	1	0
Incubated 23 hours--	19	7	12	0
Antigen heated at 100° C.:				
Incubated 23 hours--	19	1	3	15

<sup>1</sup> Each serum was tested with and without steer serum, with similar results.

showed rapid agglutinating activity and was proved to be reagin. The second antibody acted more slowly and has not been identified. Its possible identity with the TPI antibody will be the subject of a later report.

The mechanism by which steer serum enhances agglutination has not been explained. With the reagin antibody, the reaction appeared to be accelerated. The reagin titer was higher with steer serum in tests read at 10 minutes, but no enhancement was obtained after an incubation period of 2 hours. On the other hand, in experiments with syphilitic serum from which reagin had been removed, steer serum enhanced agglutination after an incubation period of 23 hours. Whether this effect was due to an increased sensitivity of the test or to the participation of more than one antibody has not been determined. These problems, together with the preparation of more efficient antigens, are under continued study.

### Summary

The presence of at least two agglutinating antibodies was demonstrated in syphilitic serum. One antibody agglutinated rapidly and was identified as reagin. The identity of the other, more slowly acting, antibody has not been determined. The sensitivity of the antigen increased in proportion to the temperature at

which it was inactivated. Heating the antigen at 100° C. markedly decreased its specificity.

### REFERENCES

- (1) Tani, T.: Studies on the agglutination of syphilis spirochetes. *Jap. J. Exper. Med.* 18: 11, Feb. 20, 1940.
- (2) Cain, R. M.: The phenomenon of treponemal agglutination for the serodiagnosis of syphilis. A preliminary report. *Canad. J. Pub. Health* 44: 61-66, February 1953.
- (3) Hardy, P. H., and Hollander, D. H.: Studies on the agglutination of *Treponema pallidum* by immune sera. Symposium on recent advances in the study of venereal diseases, Washington, D. C., U. S. Public Health Service, 1953.
- (4) McLeod, C. P., and Magnuson, H. J.: Agglutination of *Treponema pallidum* in syphilitic serums. *Pub. Health Rep.* 68: 747-755, August 1953.
- (5) Hole, N. H., and Coombs, R. R. A.: The conglutination phenomenon. I. An introduction to the conglutination phenomenon and an account of the observation and views of previous investigators. *J. Hyg.* 45: 480-489, December 1947.
- (6) Nelson, R. A., Jr., and Mayer, M. M.: Immobilization of *Treponema pallidum* in vitro by antibody produced by syphilitic infection. *J. Exper. Med.* 89: 369-393, Apr. 1, 1949.
- (7) Eagle, H.: Studies in the serology of syphilis. VI. The induction of antibodies to tissue lipoids (a positive Wassermann reaction) in normal rabbits. *J. Exper. Med.* 55: 667-681, April 1932.
- (8) Harris, A., Rosenberg, A. A., and Del Vecchio, E. R.: The VDRL slide flocculation test for syphilis. II. A supplementary report. *J. Ven. Dis. Inform.* 29: 72-75, March 1948.

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# Physicians in Public Health

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**P**UBLISHED DIRECTORIES and listings accumulated by several professional organizations and health agencies give only partial or noncurrent information on the number and characteristics of physicians who devote full time to public health activities. All such listings have been prepared for some specific purpose which in no case encompasses that of providing a complete inventory of full-time public health physicians.

The purposes of the present study were to obtain as complete a count as possible of physicians engaged full time in the field of public health; to analyze their characteristics, qualifications for public health work, and geographic distribution; and to ascertain their medical school background. This paper covers the first two of these purposes.

Prerequisite to making such a study was the adoption of a definition of public health. Although not providing specific criteria for selection of physicians, the broad and widely accepted concept of public health as organized

community effort for "preventing disease, prolonging life, and promoting physical and mental health and efficiency," expressed by Dr. C.-E. A. Winslow (1), seemed the most useful. With this definition, it was possible to establish a broad requirement for inclusion in the study, that is, service in preventive medicine as a teacher, an administrator, a research investigator, or a practitioner in governmental or organized voluntary activities, as contrasted with service in clinical medicine or independent practice.

As will be shown in the discussion of the available sources of information, decisions with regard to the inclusion or exclusion of individual physicians had to be fairly arbitrary, and the list compiled is admittedly incomplete. Nevertheless, the accumulation of a total count of almost 3,500 full-time public health physicians and the analysis of data on their distribution by age, position, and geographic location are believed to be a useful start toward more definitive and detailed studies.

## Materials and Method

The primary sources used in the study were the following:

1. The list of diplomates of the American Board of Preventive Medicine in the 1951 edition of the Directory of Medical Specialists (2) plus a list of physicians who received their certificates in 1951, the latter obtained from the files of the secretary of the board.

2. The 1951 Directory of Full-Time Local Health Units (3).

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3. The 1951 Directory of State and Territorial Health Authorities (4).

4. Information on full-time faculty members in schools of public health obtained in a 1950 survey of these schools (5).

5. A list of physicians with regular or active reserve commissions in the Public Health Service who were engaged in nonclinical work in 1951.

6. Information on full-time faculty members in departments of preventive medicine obtained by the Office of Defense Mobilization in its 1951 survey of medical school faculties.

7. Schedules listing full-time health department personnel collected by the Division of State Grants, Public Health Service, in a study made for the National Security Resources Board in 1951.

8. Lists furnished by the Army, Navy, and Air Force of personnel giving full time to preventive medicine and public health in 1951 (Air Force data are for 1953).

None of these sources gives a complete picture of all physicians engaged full time in public health work. The following limitations on the inclusiveness of the listings should be noted.

The roster of diplomates of the American Board of Preventive Medicine does not include all physicians in public health because many of them lack the requisite 6 years of special training, teaching, or practice in preventive medicine. Furthermore, the board was established only in 1948, and many eligible physicians have not yet applied for certification. The diplomates, therefore, represent only the more experienced physicians in the field of public health.

Reports of the number of physicians employed full time in State and local departments and other non-Federal governmental agencies, of course, give no indication of the number in other types of organizations. Numerous physicians engaged in public health work are employed by voluntary agencies and foundations.

Since the Public Health Service, the Army, the Navy, and the Air Force are responsible for a wide range of operations in the field of medicine, it was necessary to separate the physicians concerned primarily with public health from those concerned primarily with clinical medicine. For Public Health Service person-

nel, all physicians with a Regular or Active Reserve Corps commission engaged in non-clinical work were included, whether in the Public Health Service or detailed to other Federal agencies. For the other services, groups of physicians working full time in various branches of preventive medicine were selected, after a review of the classification maintained in each service, on the basis of both qualifications and nature of assignment. None of these services was able to furnish a complete listing of physicians giving full time to preventive medicine.

Other Federal agencies—such as the Children's Bureau, Department of Health, Education, and Welfare; the Veterans Administration; and the Atomic Energy Commission—which employ a number of public health physicians, were not asked for lists. Some of their public health physicians are included, however, because they are commissioned officers of the Public Health Service or because they are diplomates of the American Board of Preventive Medicine. For example, almost two-thirds of the regional medical directors and the physicians on the headquarters staff of the Children's Bureau are diplomates.

In addition to the 8 primary sources of information, 3 secondary sources were used to supply biographical data: the 1950 American Medical Directory (6), the 1951 Membership Directory of the American Public Health Association (7), and lists of physicians awarded public health degrees by approved schools of public health.

Physicians listed only in the secondary sources were not included in the study, for various reasons. There is no assurance, for example, that all 1,567 physicians listed in the 1950 American Medical Directory as limiting their practice to public health were actually in the public health field at that time. This directory is based on cards mailed to all physicians; the number of physicians who failed to return the card and for whom, therefore, the directory information is not current is unknown. The Directory of the American Public Health Association includes foreign physicians, physicians engaged only part time in public health, and physicians with an interest in public health, as well as those devoting full time to the field.

Because the major sources of information provided data for 1951, an effort was made to obtain data from other sources relating as closely as possible to that year.

In collating the information from the several primary sources, the following procedure was used: The names of all diplomates of the American Board of Preventive Medicine were first entered on cards. These cards were alphabetized and checked against the directories of State and local health departments; a card was then made for each additional physician listed in these directories. In like manner, cards were added for physicians listed in the other primary sources. Of the 3,484 physicians included in the study, 29 percent were obtained from the list of diplomates; 27 percent from the directories of State and local health departments; 25 percent from the special study of health department personnel; 14 percent from the list of Public Health Service commissioned officers; and 5 percent from the other sources.

The card for each physician contained as much of the following information as could be obtained: name; State and city in which located; year of birth; medical school; year of graduation; specialty board certification, if any; present position; degree in public health, if any; school from which degree in public health was obtained; date of degree in public health; specialty, if indicated in the American Medical Directory.

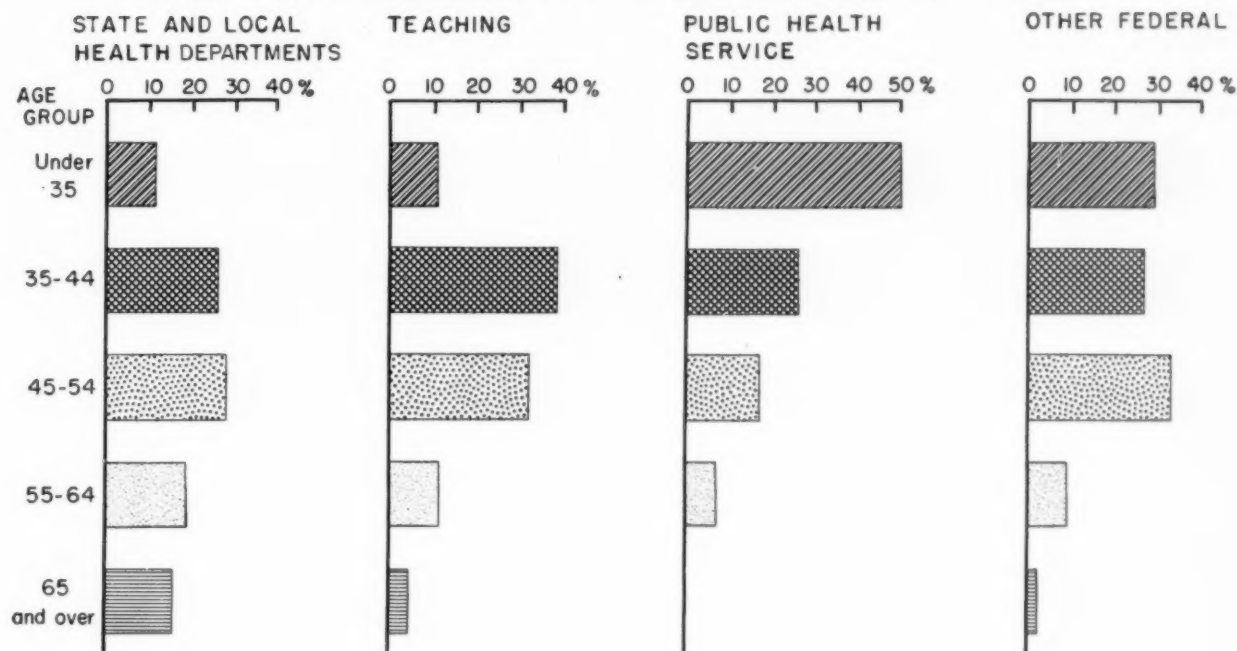
#### Type of Position

In 1951, an estimated 3,441 physicians were engaged full time in some phase of public health work. Almost half (48 percent) of them were in local health departments. The next largest group (18 percent) comprised the commissioned officers of the Public Health Service. An additional 17 percent were in State and Territorial health departments. Physicians in Federal positions other than the Public Health Service

**Table 1. Public health physicians by present position and age, 1951**

Present position	All ages	Age group					
		Under 35	35-44	45-54	55-64	65 and over	Unknown
Total.....	3, 484	641	922	920	569	412	20
Engaged in public health work.....	3, 441	641	915	912	557	396	20
State or Territorial health department.....	581	53	186	196	93	52	1
Health officer.....	52	0	16	20	8	8	0
Other.....	529	53	170	176	85	44	1
Local health department.....	1, 645	186	383	414	338	310	14
Health officer.....	1, 003	92	205	238	215	241	12
Other.....	642	94	178	176	123	69	2
Other State or local agency.....	56	7	11	15	12	11	0
Teaching.....	168	18	65	54	19	9	3
School of public health.....	72	6	27	27	10	1	1
Preventive medicine in medical school.....	66	12	26	20	2	4	2
Other.....	30	0	12	7	7	4	0
Public Health Service.....	627	309	163	108	46	0	1
Other Federal.....	239	68	64	79	22	5	1
All other.....	125	0	43	46	27	9	0
Hospital.....	40	0	13	15	10	2	0
Voluntary agency or foundation.....	43	0	12	15	12	4	0
Other positions.....	42	0	18	16	5	3	0
Not engaged in public health work.....	43	0	7	8	12	16	0
Private practice.....	4	0	0	2	2	0	0
Retired.....	16	0	0	0	4	12	0
Position unknown.....	23	0	7	6	6	4	0

Figure 1. Age distribution of public health physicians by type of position, 1951.



accounted for 7 percent; those engaged in teaching, for 5 percent; and those working in State and local governmental agencies other than health departments, for 1 percent. The remaining 4 percent were in hospitals, voluntary agencies or foundations, or "other positions." In addition to the physicians engaged full time in public health, 4 physicians in private practice, 16 who were retired, and 23 for whom the present position was unknown are included, giving a grand total of 3,484 physicians. The physicians in the "all other" category and those not actually working in public health are included because they are diplomates of the American Board of Preventive Medicine.

#### Age Distributions

Analysis of the physicians in public health by position and age brings out some interesting relationships. Of the 641 physicians under 35 years of age, 309, or 48 percent, are in the Public Health Service. At the other end of the age scale, 75 percent of the 412 physicians 65 years of age and over are in local health departments.

The distribution by age of physicians in different types of public health positions is shown in table 1 and figure 1. Although the proportions in each age group vary somewhat, the

age patterns are similar for physicians in State health departments, local health departments, and other State and local governmental agencies. For each of these, the largest proportion of physicians is in the 45-54 age group. The age distribution for physicians in full-time teaching positions differs in several respects from the distribution for physicians in those positions: The largest proportion of teachers is in the 35-44 age group, and the proportion in the youngest and oldest age brackets is smaller.

The percentage distribution by age of physicians in State and local health departments in the United States is shown separately in table 2. The proportion of physicians who are 55 years of age or over is substantially larger in local health departments (40 percent) than in State health departments (26 percent). This is attributable to two factors. First, physicians in positions other than that of health officer tend to be younger than the health officer. For example, 24 percent of local health officers are 65 years of age or over but only 11 percent of other physicians in local health departments are in this age group. Second, health officers account for 60 percent of physicians in local health departments but for only 9 percent of those in State health departments.

The age spread of physicians in local health departments is much greater than in State health departments. With the relatively high proportion of physicians in local health departments who are 65 years of age or over, special

emphasis on attracting physicians to local health work will be necessary. This problem seems particularly serious inasmuch as many States are making intensive efforts to expand local health activities.

**Table 2. Percentage distribution of physicians in State and local health departments in the United States by regional location and age, 1951**

Location	All ages	Age group				
		Under 35	35-44	45-54	55-64	65 and over
United States Northeast North Central South West	All health departments					
	100.0	9.7	26.0	27.5	19.5	17.3
	100.0	6.9	29.1	28.8	23.7	11.5
	100.0	10.3	20.9	29.6	18.8	20.4
	100.0	11.0	22.1	26.1	20.0	20.8
	100.0	9.7	37.5	26.4	13.9	12.5
	State health departments					
	100.0	8.5	32.7	32.7	16.1	10.0
	100.0	7.2	33.3	26.8	22.2	10.5
	100.0	10.6	30.9	35.1	11.7	11.7
	100.0	7.4	29.7	36.0	16.6	10.3
	100.0	10.2	39.8	34.1	9.1	6.8
	Local health departments					
	100.0	10.1	23.8	25.7	20.7	19.7
	100.0	6.7	26.8	29.9	24.5	12.1
	100.0	10.2	18.1	28.0	20.8	22.9
100.0	12.0	20.0	23.4	20.9	23.7	
100.0	9.5	36.7	23.9	15.5	14.4	

**Table 3. Public health physicians by regional location and present position, 1951**

Location	Non-Federal					Federal		Private practice, retired, unknown
	Total	State or Territorial health department	Local health department	Teaching	All other	Public Health Service	Other	
Total <sup>1</sup> .....	2,643	<sup>2</sup> 616	<sup>3</sup> 1,678	168	181	559	239	43
United States.....	2,452	539	1,584	160	169	477	154	41
Northeast.....	606	157	301	51	97	56	18	12
North Central.....	511	96	343	47	25	41	19	5
South.....	932	190	672	41	29	314	94	12
West.....	403	96	268	21	18	66	23	12

<sup>1</sup> Includes 360 physicians in Territories and countries other than the United States. <sup>2</sup> Includes 35 Public Health Service physicians serving in State or Territorial health departments. <sup>3</sup> Includes 33 Public Health Service physicians serving in local health departments.



**Table 4. Public health physicians by present position and professional characteristics, 1951**

Present position	Total	With graduate degree			Percent with graduate degree	Diplomates of American Board of Preventive Medicine	
		Total	Master level	Doctorate level		Number	Percent
All positions.....	3, 484	1, 232	1, 042	190	35. 4	1, 008	28. 9
State or Territorial health department.....	581	267	233	34	46. 0	213	36. 7
Local health department.....	1, 645	465	419	46	28. 3	254	15. 4
Other State or local agency.....	56	7	6	1	12. 5	14	25. 0
Teaching.....	168	96	60	36	57. 1	104	61. 9
Public Health Service.....	627	163	133	30	26. 0	133	21. 2
Other Federal agency.....	239	133	115	18	55. 6	122	51. 0
All other.....	168	101	76	25	60. 1	168	<sup>1</sup> 100. 0

<sup>1</sup> These physicians were included in the study only because they are diplomates of the American Board of Preventive Medicine.

The regional variation in the age distribution of physicians in State and local health departments is also shown in table 2. (Region designations are those used by the Bureau of the Census.) In each region, there is a larger proportion of State health department physicians than of local health department physicians in the younger age groups, as the following tabulation further illustrates:

	Percentage of physicians less than 45 years of age	
	Local health department	State health department
United States.....	33. 9	41. 2
Northeast.....	33. 5	40. 5
North Central.....	28. 3	41. 5
South.....	32. 0	37. 1
West.....	46. 2	50. 0

In spite of this consistency, there are significant regional differences in the age distributions of health department physicians. The West, where public health agencies have been expanding rapidly, has the highest proportion of public health physicians in the younger age groups. The lowest proportion of young physicians is in the North Central region for local health departments and in the South for State health departments.

The age distribution of physicians in the Public Health Service is distinct from that for any other group. The highest proportion, 49 percent, is in the group under 35 years of age, and the proportion decreases in each succeeding

age period. Since Public Health Service physicians must retire at age 64 years, none are in the highest age group. (The Air Force, which is included in the category "other Federal" also showed a very high proportion, 72 percent, in the under 35 age group, perhaps in part because the Air Force has been expanding.)

### Regional Location

The regional location of physicians in various types of public health positions is shown in table 3. The classification by position in this table differs slightly from that used in table 1. The Public Health Service physicians serving in State, Territorial, or local health departments are included with the personnel in these departments rather than with the Public Health Service group. This allocation seems appropriate because these physicians give the same kind of service as that furnished by the health department employees in similar positions.

The proportion of non-Federal public health physicians in different types of positions varies considerably from one region to another. About half of those in the Northeast region are in local health departments, whereas the proportion is between 65 and 75 percent in the other three regions. On the other hand, the proportion of public health physicians in State health departments is higher in the Northeast than in the other three regions.

The distribution of all non-Federal physicians by region in relation to the population distribution is shown below:

	<i>Non-Federal public health physicians (percent)</i>	<i>1951 civilian population (percent)</i>
United States .....	100	100
Northeast .....	25	26
North Central .....	21	30
South .....	38	31
West .....	16	13

The Northeast and the West have about the same proportion of public health physicians and of population. The North Central region has a considerably lower proportion of public health physicians than of population, and in the South the reverse is found.

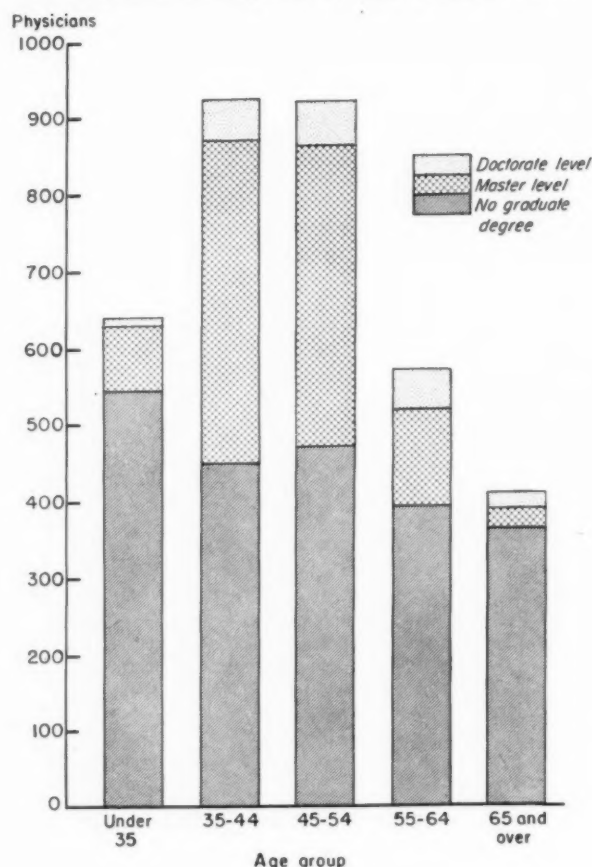
### Graduate Degrees

Of the 3,484 public health physicians included in the study, 1,232 (35 percent) have one or more graduate degrees (table 4). Among the physicians with graduate degrees, 1,042 have a master's degree or certificate and 190 have a doctorate degree. The majority of those with master level training have a degree in public health, but a few hold a master of science or a master of arts degree. At the doctorate level, 139 hold the degree of doctor of public health, 38 are doctors of philosophy, and a few have other doctorates.

The proportion of physicians with graduate degrees varies considerably from one type of position to another. While 46 percent of all physicians in State health departments have graduate degrees, 73 percent of State health officers and only 43 percent of other physicians in State health departments have such degrees. The proportion with graduate degrees is high among public health physicians in teaching positions, in "other Federal" positions, and in "all other" positions. The lowest proportion is among the physicians in agencies of State and local government other than health departments. The comparatively low proportions of Public Health Service physicians with graduate degrees may be partly accounted for by the high proportion (49 percent) of physicians under 35 years of age in this group.

The number of physicians in each age group

**Figure 2. Public health physicians with or without graduate degrees by age group, 1951.**



with and without graduate degrees is shown in figure 2. In the group 65 years of age and over, 11 percent have a graduate degree; in the youngest age category, the proportion is 15 percent; for those aged 55-64 years, the proportion increases to 31 percent; in the two age groups 35-44 years and 45-54 years, 51 and 49 percent, respectively, have graduate degrees. The relatively low percentage of older physicians with public health degrees may be attributed to the fact that opportunities for graduate training in public health were limited until the late 1930's. The number of physicians with doctorate degrees is very small for those under 35 years of age, greater for those 65 years and over, and greatest for physicians in the middle age brackets.

Substantial differences are found among the four regions of the country in the proportion of State and local health department physicians with graduate degrees or with specialty quali-

fications in preventive medicine (table 5). As may be expected, the proportion of physicians with degrees closely parallels the proportion with specialty qualifications. These characteristics, in turn, are correlated with the proportion of physicians between 35 and 54 years of age. The West, with the highest proportion of physicians in this age group, has the highest proportion with graduate degrees or with specialty qualifications. The South, with the lowest proportion of public health physicians in the 35-54 age group, has the lowest proportion of physicians with these qualifications. In general, roughly the same relationships hold when characteristics of physicians in State and local agencies are examined separately.

### Specialization

Twenty-nine percent of the public health physicians in the study are diplomates of the Amer-

ican Board of Preventive Medicine (table 4). Again great variation appears among physicians in different types of positions. Physicians in "all other" positions are all diplomates—the reason for their inclusion in the study. State health officers have the highest proportion of diplomates (79 percent); physicians below the health officer level in local health departments, the lowest proportion (10 percent).

Of the 1,008 physicians who are diplomates of the American Board of Preventive Medicine, 66 also hold a certificate from another American board. In addition, 178 other physicians in the study are diplomates of other specialty boards—48 of pediatrics, 37 of internal medicine, 27 of psychiatry and neurology, 20 of pathology, and a few each of 9 other boards. In some instances this specialization indicates a shift in interest or in type of practice from the designated specialty to public health. In other instances a physician employed full time in a health de-

**Table 5. Physicians in health departments by regional location and professional characteristics, 1951**

Location	Total	With graduate degree			Percent with graduate degree	Diplomates of American Board of Preventive Medicine	
		Total	Master level	Doctorate level		Number	Percent
All health departments							
United States.....	2,061	701	625	76	34.0	443	21.5
Northeast.....	451	182	156	26	40.4	104	23.1
North Central.....	427	132	117	15	30.9	82	19.2
South.....	831	232	212	20	27.9	150	18.1
West.....	352	155	140	15	44.0	107	30.4
Local health departments							
United States.....	1,551	452	407	45	29.1	248	16.0
Northeast.....	298	113	99	14	37.9	61	20.5
North Central.....	333	79	69	10	23.7	40	12.0
South.....	656	161	147	14	24.5	82	12.5
West.....	264	99	92	7	37.5	65	24.6
State health departments							
United States.....	510	249	218	31	48.8	195	38.2
Northeast.....	153	69	57	12	45.1	43	28.1
North Central.....	94	53	48	5	56.4	42	44.7
South.....	175	71	65	6	40.6	68	38.9
West.....	88	56	48	8	63.6	42	47.7

partment is a specialist in child health work, mental health work, or laboratory work, or in other positions requiring special clinical competence.

The 1950 American Medical Directory lists 1,146 of the 3,484 physicians in the study as full-time specialists in public health. An additional 470 physicians in the study are listed in the directory as full-time specialists in other fields, and 154 are listed as giving special attention to a specialty. Of those listed as full-time specialists in other fields, the largest numbers are in internal medicine, pediatrics, and pulmonary diseases. Many of these physicians are listed as specialists in other fields because the data in the directory are less current than the other sources of information used in the present study. But, some physicians employed in State and local health departments have reported their field of medicine, such as pediatrics, pulmonary disease, and orthopedics, as their specialty rather than public health.

### Conclusions

A start has been made toward developing a count of physicians who devote full time to public health, a task facilitated by the fact that, as a result of special studies, pertinent information was available. The count was undertaken because it was felt that it would be useful in measuring the distribution of public health physicians and in analyzing their professional and personal characteristics.

Several practical difficulties arise in constructing an inventory of this type. One is the problem of definition. An inventory implies a reasonably precise definition from which criteria for inclusion may be derived. Because of rapid changes in the scope of public health, a precise definition is impossible. In approaching the task, a broad concept of public health was adopted, as expressed in Winslow's widely accepted statement. Although this definition does not provide specific criteria, it offers breadth of scope appropriate to current concepts of public health.

Another practical difficulty relates to the availability of information. Although the various sources of data used in the study give the names of physicians with special interest

and responsibility in public health, some of the individuals included in these sources are engaged in activities very similar to those of other physicians who are not included. Thus, some hospital administrators are included because they are diplomates of the specialty board in preventive medicine, whereas others, without such specialty board certification, are omitted. Similarly, physicians engaged in laboratory research in certain agencies are included in our count, while others conducting similar research in other agencies are excluded. Nevertheless, for several groups, such as physicians employed by health departments and those teaching public health and preventive medicine, the roster should be reasonably complete.

Of necessity, criteria adopted in this study are pragmatic rather than theoretically consistent. Review of the characteristics and responsibilities of physicians included in this inventory, however, may facilitate discussion of both definition and method and help resolve some of the problems we have encountered.

### REFERENCES

- (1) Winslow, C.-E. A.: The evolution of public health and its objectives. In *Public health in the world today*, edited by James Stevens Simmons. Cambridge, Mass., Harvard University Press, 1949, p. 23.
- (2) Advisory Board for Medical Specialties: Directory of medical specialists holding certification by American boards. Ed. 5. Chicago, A. N. Marquis Co., 1951, 1,694 pp.
- (3) U. S. Public Health Service: Directory of full-time local health units, 1951. *Public Health Service Pub. No. 118*. Washington, D. C., U. S. Government Printing Office, 1951, 55 pp.
- (4) U. S. Public Health Service: Directory of State and Territorial health authorities, 1951. *Public Health Service Pub. No. 75*. Washington, D. C., U. S. Government Printing Office, 1951, 61 pp.
- (5) Rosenfeld, L. S., Gooch, M., and Levine, O. H.: Report on schools of public health in the United States. *Public Health Service Pub. No. 276*. Washington, D. C., U. S. Government Printing Office, 1953, 110 pp.
- (6) American medical directory, 1950. Ed. 18. Chicago, American Medical Association, 1950, 2,912 pp.
- (7) Membership directory of the American Public Health Association, 1952. Raleigh, N. C., Health Publications Institute, Inc., 1952, 347 pp.



*The demand for inservice training is growing. How can training best be done? This report and its State case studies are offered to help the health officer answer that question and organize his training effort as effectively as possible.*

## Why and How State Health Departments Organize for Training

—Patterns and Trends—

By HENRY R. O'BRIEN, M.D., M.P.H.

APPRECIATION of the need for training of health workers is growing steadily. Health workers themselves are anxious to learn better how to meet the health needs of their people.

Nurses planning programs for staff meetings, nurses spending evenings and Saturday mornings in extension classes, sanitarians or clerks going to district meetings or taking inservice courses, retired medical officers orienting themselves for new work, people joining professional

societies or spending another year at school—all these trends testify to the interest and sense of need for continuous training.

Administrators responsible for the effective working of a department are more and more aware that a good health worker, like a scythe, must be made of good steel. He must be well ground by preliminary education, and must be sharpened from time to time.

Filling a position with a name is far from being enough. The field of public health is so widespread and is growing so rapidly today that untrained or poorly trained workers seldom are effective in an old program and seldom rise to meet the needs of a new one. When measured by effective output, many untrained workers, no matter how willing the spirit or how low the salary, are really expensive to the taxpayer.

Industry knows this. At the Congress of Industrial Physicians in Louisville, Ky., in February 1954, a spokesman for a large company said: "We are accustomed to spending \$2,000 on the training of a machine operator, \$5,000 on training a supervisor."

A fee of \$75 or \$125 is a commonplace item

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when a plant is invited to send a staff member to a 3-day institute. If industry finds such an investment worth while, should public service be more timid?

A State health department is generally accepted as responsible for the training provided its staff and for local health workers. Fortunately, an important part of the task is already done when the merit system sets educational and experience requirements and salary ranges. Today's appointees, therefore, may no longer need some kinds of training and may have greater capacity for advanced courses.

At that the need for training is very broad. The last annual survey of nurses (1) showed that only 36.8 percent of the public health nurses in State and local organizations have had a year of formal training in an approved public health program of study. How can this be improved? Sanitary engineers in the Public Health Service have just started a similar study to learn the exact training needs among sanitarians.

How many untrained health officers are appointed?

What is done for those neglected persons, the health department clerk and the institutional worker?

How is the trained health worker kept up to date, the scythe kept sharp?

A sound pattern of training will deal with these and other problems. It will include formal courses, accredited or nonaccredited, as well as orientation, field training, seminars, staff conferences, supervision, refreshers, and so forth, and even correspondence work on occasion.

When a State health department decides to meet its responsibility in training, how should it plan to organize?

To help one State consider that essential question, the Public Health Service regional office in Washington, D. C. (Region III), gathered information from 45 of the 48 States and the District of Columbia. Information so obtained is shared in this paper.

### **Organization for Training**

In every State health department some form of training of State and local health workers is

going on. The need is recognized, but some departments are held back by State laws, legislative feeling, or budget cuts. Resourceful commissioners manage to meet the need for training in one way or another.

In many States training is carried on merely in separate divisions, with no evident correlation. Many other States have set up committees, whose members sometimes come from within the health department, sometimes from outside, and sometimes from both. Committees are especially useful in evolving a philosophy of training in the department and in obtaining support for that philosophy.

Effort is focused effectively when direction or coordination of training within a department is made the responsibility, part-time at least, of one person. Some 18 States report having a part-time director, whose activity and degree of responsibility differ from State to State. Eight States now feel that training is important and extensive enough to have a full-time professional worker as coordinator.

Organization of training in the States surveyed falls into various patterns. Various trends are evident. Patterns and trends in turn suggest certain conclusions and recommendations which can be adapted to fit local circumstances.

### **Training Within the Division**

In looking for the simplest form of organization for training in a State health department, we find inservice training going on in separate divisions.

Each office sees a need for training and sets about to meet the need itself, generally without reference to what other divisions are doing. There is sometimes a person in the division spending full time in this work.

The bureau of laboratories in the Maryland State Department of Health, for example, has its own training division.

In numerous States public health nursing has a director of education.

Virginia has a full-time director of sanitarian training.

Some other States have a similar worker loaned by the Communicable Disease Center of the Public Health Service. However, training

activity is confined to a single discipline, and there is little exchange of ideas or experience among divisions. Occasionally one office requests allocation of time or money for training also sought by another office. Then the two requests go to the commissioner of health or the budget authority for decision.

Such is probably the situation in more than half of the State health departments. Usually they are the smaller departments, but not always. When training is confined to divisions, progress is apt to be uneven. Valuable ideas may be lost because they are not shared, and there is nothing in the system to stimulate development of team spirit.

### **Coordination Through a Committee**

The next step in the evolution of organization is the use of a committee.

In Maryland, for example, five carefully chosen State and local health workers set to work recently to plan a State training program from the beginning.

In Kentucky, after training was practically wiped out by budget cuts, a small committee of division heads was appointed to lay new plans.

Florida has a standing committee of three division chiefs, the personnel supervisor, and the director of its inservice training center.

Oregon has two committees. One, made up of staff members from a number of sections, outlined the overall program for the board of health's inservice training. The details of these plans are eventually worked out with the program director and the division head concerned. The second, which is known as the training committee, consists of representatives from the divisions of local health services, of environmental sanitation, of preventive medical services, and of the personnel officer and the director of public health nursing.

Oregon's training committee recommends to the State health officer policies on formal training of State and local health workers and proposes a budget. Some 3 years ago this committee helped to set up a long-term priority program, for (1) public health physicians, (2) public health nurses, (3) public health engineers, (4) sanitarians, (5) health educators and administrative officers, and (6) clerical workers.

The committee weighs the training needs of local health departments and of the State and recommends a budget for training available personnel, under these priorities.

### **Under a Part-Time Director**

A committee is excellent for planning or recommending policies, but it is not so effective in administering a program. In operation some one person is needed to give coordination or direction to training in the whole department.

This service is frequently on a part-time basis, as in Delaware, with its three counties. Here all training is directed by the chief of the division of health education.

Wisconsin's training is the responsibility of the assistant State health officer, who also heads general administration in the health department. He is assisted by the personnel officer.

In Indiana, the chief of the personnel and training division reports directly to the commissioner. In the 1955 budget, an effort was made to provide a full-time director of inservice training but without success.

More often such part-time responsibility for training is carried by the director of local health. This is the case in Kansas, which has 14 local health departments and a rather limited State health staff.

In Tennessee, which has much activity in staff education, and in Texas and Washington, training is coordinated under local health services.

In Arkansas and New Mexico, training is directed by the deputy State health officer, who is also in charge of local health. Plans for training are discussed at departmental and division staff conferences.

In North Carolina, which is well organized locally, the chairman of the central training committee is the director of local health or, recently, his deputy. The committee itself is a large one, with 18 to 20 members drawn from State and local departments of health and university people. It has done valuable work in advising on programs, coordinating actual training, and stimulating budget provision.

### *Michigan's Committees*

Michigan has many local units also; its extensive training program is supervised directly

by the chief of local health administration. He is aided by a series of carefully organized committees. There are five different types of committees.

A planning board has since 1950 advised Michigan's commissioner of health in matters of staff education. It has 2 members from the department—the directors of local health administration and of the division of laboratories—and 8 members from the State at large. Two health officers and a nurse are from county departments of health; the other members are from the Wayne University Department of Public Administration, the W. K. Kellogg Foundation, the division of continuing education at Michigan State College, the State bankers' association, and the State training council. The planning board aids in organization of training, drawing of policies, and evaluation of programs.

The coordinating committee is composed entirely of division and section chiefs in the State department of health.

There are 7 technical committees for different professional and clerical workers. In addition, there are 5 project committees—none with permanent membership. The members in general represent State and local departments and the various categories, as well as university and private agency workers. The technical committees maintain liaison between State and local programs, and the project committees are organized to plan and carry out specific training programs. There is also a fellowship selection committee.

When State and local health departments met a serious cut in Federal aid in 1953, the technical committees expressed the needs for adequate funds for the training projects. These were reviewed and supported by the coordinating committee, and the projects were allotted the necessary funds.

#### **Under a Full-Time Director**

An increasing number of State health departments have decided that training is important enough to call for a full-time competent professional worker. In a similar situation a full-time director of graduate education is now

found in an increasing number of larger hospitals.

#### *In Louisiana*

Training in Louisiana is organized around a central State training center, whose primary function is to plan for all State training needs for the health professions. The center has a full-time director, a training staff, and an advisory committee composed of 4 division chiefs, 2 local health officers, and representatives of the 2 medical schools in Louisiana. The director, who is a physician, reports directly to the State health officer. He also has a faculty appointment to the department of public health in the Tulane University School of Medicine.

Louisiana's training center is responsible for:

- Determining needs.
- Forming overall plans.
- Integrating all training programs in the State.
- Planning facilities.
- Supervising local field training programs.
- Planning assignments.
- Consultation.
- Liaison with educational institutions.
- Preparing budgets for training purposes.
- Selection of individuals.
- Evaluations.
- Recommending to local areas the principles and objectives of field training, policies, content of each category, field experience for students, methods, and procedures.

#### *In Upstate New York*

Training has probably been most extensively developed in upstate New York, where 337 professional health positions in 1953 were listed in the budget of the State department of health, and 1,396 were listed in county and city departments (2). These numbers were exclusive of positions in New York City and in laboratories and hospitals. As elsewhere, training evolved in divisions. This trend started in 1934.

In 1948, the office of professional training was established to integrate and correlate activities of training units in the different divisions. The office itself has only 2 professional workers, a physician, and an engineer. In addition, 3 nurses work full time in a training and education unit in their own bureau, and workers in other divisions give part of their time to training activities.

All these people primarily concerned with



training have scheduled monthly meetings and frequent conferences. Training functions are unified; facilities are used in common; uniform policies and procedures are set up; and funds are distributed equitably through this machinery. The training budget and reports of the commissioner of health, both representing the combined thought of all concerned with training, are submitted through the office of professional training.

The training budget for 1953 was \$624,495, some 40 percent of which came from State sources. In addition, some training expenses, especially incidental or part-time expenses, are paid from the regular budget.

As rapidly as needed, separate training programs have been set up for different professions and positions. A careful analysis of needs was made before each program was decided upon. In each field, an advisory committee, chosen both from within the State government and from outside, has been useful in developing policies and procedures.

In New York, as in New Jersey, the training of clerical workers in the health department is handled by the division of personnel.

New York City is not included in this study. Because of its size and the number of personnel employed in public health, it has a separate training program, and a full-time position with responsibility for training has been established in the city health department. A physician fills this position.

#### *In Massachusetts*

The Massachusetts program has developed rapidly on a somewhat different tack. In 1950, an outside grant for a period of 5 years made it possible to plan anew and to expand the training work then carried on in the State department of health. A division of training was established in the bureau of administration. The director of the division serves full time as the coordinator and program administrator of all training activities in the department. Educational directors were appointed for each of five special groups (health officers, public health nurses, medical social workers, health educators, and sanitarians). Those in nursing, social work, and sanitation give full time to training; others have responsibilities in other divisions.

Educational supervisors are assigned to selected local units. The division naturally receives much help from service workers in other offices, State and local.

Since attention was originally centered on field training the overall advisory group still holds the title of General Advisory Committee on Field Training. The members from the State department of public health are the commissioner and the director of the division of training; the latter is executive secretary. The others on the committee are from educational institutions or local health departments. There are 10 members in addition to the secretary and a consultant. Advisory subcommittees on several aspects of field training were also set up in 1951. A variety of programs have been worked out.

There is a field training center for sanitarians at Amherst College, but various local departments are used in other fields. One feature of the Massachusetts program is close cooperation with various schools of nursing, social work, and medicine, with the University of Massachusetts, and the Harvard School of Public Health.

#### *In Pennsylvania*

In Pennsylvania, the division of professional training, with other staff functions, was set up in 1951 as part of the executive office, 1 of 5 groupings in the State department of health. The director is the only full-time professional worker in the division; program activities are carried on through the program directors in the department.

A technical advisory committee on training is made up of some 12 members from outside the department; these are chosen from universities and local health departments, and represent 7 professional interests. A newly created inservice training committee is composed of department staff members, representing major public health professions.

All training is considered as being divided into four parts: graduate, undergraduate, field training, and continued education. Wide use is made of extension courses for public health nurses, and of the Pittsburgh training center for sanitarians.

The budget of the division comes from both State and Federal funds. One great difficulty

is the lack of legislation permitting the State department of health to use State funds in assisting local health department staffs to secure training.

### *In Georgia*

Georgia has a division of training in the bureau of administrative services. This division was organized in 1952 to (a) coordinate all training activities existing in the divisions, (b) determine need and promote activities, (c) attempt to develop public health training potentialities, in any field, of the State systems of higher education, (d) develop training centers for all types of personnel, and (e) evaluate how activities meet needs.

The staff of the division consists of the physician-director and a secretary. The director feels responsible primarily only for quality, adequacy, and availability of training, and seeks the cooperation of the older divisions. Training itself, he feels, is the task of service divisions.

An advisory committee was formed, made up of division and service directors most concerned with training, with others from certain divisions and from local departments of health. Subcommittees were set up for certain problems. The advisory committee reviewed the content of established training programs and the range of programs offered and prepared papers entitled "Policies for Support of Training" and "Criteria for the Section of Local Health Departments as Field Experience Centers" for the approval of the State director of health.

Field training for sanitarians is concentrated in a new center set up in cooperation with the Public Health Service's Communicable Disease Center and the Fulton County and DeKalb County health departments. Other field training will be scattered through a number of local departments.

In addition to usual features of a good training program, a 12-hour course for division secretaries was arranged in 1953 for the central office.

### *In California*

The training program in California underwent a number of changes during 1954. The

former coordinator of training in the division of local health service became the training officer within the division of administration.

A new external advisory committee on training, composed of 13 members appointed by the State board of health, replaced the former internal advisory board on training, which consisted of 7 members including 5 division chiefs and 2 bureau chiefs.

The new committee is made up of people from industry, city government, local health officers, county boards of supervisors, deans of schools, and others. As formerly, the bureau of business management, the personnel officer, and the chiefs of the various divisions, bureaus, and services have certain designated responsibilities, as outlined in a chapter on training policies in the administrative manual of the department.

The training officer is the immediate director of the training aid program. All training matters pass across his desk, and his approval is necessary for each major step. He and others are guided by the training policies referred to above.

The advisory board, with purely advisory functions, is presided over by the director of the State department of public health.

The bureau of business management handles the fiscal details and the direct relationships with the State department of finance; the department of finance must approve all trainee applications in terms of the training budget, which must also have its approval.

The heads of department units are responsible for initially recommending training applicants and for contacts with training institutions. The individual grants and the financial allowances must have the approval of the training officer as to conformity with training policies.

The chief of the division of administration is the responsible head of the financial administration of the training program and is responsible for adherence to administrative policies of the department and relations with the director of the department.

The medical residency training program under the immediate head of the director of the division of local health services operates through the training office.

Training is of all types and in all professional

fields. Inservice training activities also come within the purview of the training office. The great majority of those trained are from or for local health departments.

Funds used come from the various Federal appropriations designated for this purpose. Each fall, requests for training funds for the following fiscal year are submitted to the training officer by the various units of the department. These requests are reviewed within the department, and a budget satisfactory to the director is submitted for approval of the State finance department, and as part of the State budget, for the approval of the legislature and the Governor. The training item in the 1954-55 budget, as signed by the Governor, stands at \$144,000.

#### *In Virginia*

The Virginia State Department of Health plans to bring a local health director into the division of local health at the central office to be in charge of all training. As previously mentioned, there is already a full-time worker in charge of sanitarian training.

#### *In Ohio*

The Ohio State Department of Health has a bureau of direct services which is directly responsible to the director of health. The chief of this bureau, a position now vacant, is in effect the training officer and the research coordinator of the department. The actual training operations are for the most part carried out in the various program divisions, but the budget preparation and control, the overall training philosophy, and the policy and rules governing training originate from this office. The departmental manual has a chapter on training.

There is an effective training committee composed of representatives of the professional disciplines in the department, which acts as a council to establish policy and in other ways to manage the training programs. The divisions of nursing and of sanitary engineering have each on its own staff a training officer, who represents the division on the central training committee. The assistant chief of the laboratory represents that discipline, and one of the medical division chiefs represents physicians. The personnel officer of the department repre-

sents the clerical forces, and an administrator from the division of administration serves as the secretary and fiscal officer for the committee. The professional disciplines having fewer workers rotate representation on the committee.

With the help of this committee, the bureau of direct services has prepared two publications entitled, "Definitions of Types of Training," and "Recommended Minimum Standards for Field Training Areas." A general policy outline is presently being developed by the committee and is expected to be completed and promulgated in the next few months. The division of nursing has developed procedures for the use of its staff conferences.

At budget time all divisions submit their training proposals. From these the committee and the training officer establish the training program for the coming year, with regard to balance among professional categories, programs, and types of training.

The budget for the 1954-55 fiscal year was set at \$135,000, of which \$62,000 was grant-in-aid funds for 11 local departments of health which maintain approved training facilities. It is Ohio's feeling that the training program should be the last item to be deleted among the various programs to which Federal money is assigned.

The present Ohio law does not permit State appropriation of funds for the training of individuals.

#### **Some of the Trends**

In all, 8 States have a full-time director of professional training, or plan to have one in the near future. In three States, Georgia, Louisiana, and Massachusetts, recently, the director of training has been given added major responsibilities. The accompanying table summarizes some information about the positions. A study of this table suggests three trends:

The movement toward a full-time director of training seems to be spreading.

States which have made appointments have most frequently chosen a doctor of medicine.

The table of organization usually places the director of training well up in the health department.

Related to the administrative pattern for



**Data on States with full-time directors of training**

State	Year system started	Degree held by director	Director reports administratively to—
California.....	1948	Dr.P.H.....	Director, division of administration.
Georgia.....	1952	M.D.....	Bureau of business administration
Louisiana.....	1946	M.D.....	State health officer.
Massachusetts.....	1950	Ph.D.....	Bureau of administration.
New York.....	1948	M.D.....	State health officer.
Ohio.....	( <sup>1</sup> )	( <sup>2</sup> ).....	State health officer.
Pennsylvania.....	1951	B.S.E., M.P.H.....	The executive office.
Virginia.....	1954?	M.D.....	Director of local health.

<sup>1</sup> Information incomplete.

<sup>2</sup> Position vacant.

training is the question of whether a State sends most or all of its new workers to one training station or disperses them among several. At one time thinking favored a single training center, but the current shifted.

In 1950, after 2 years of study, California changed to the use of dispersed stations, that is, several good local departments able and willing to receive several trainees in one or more fields. In reaching the decision it was felt that (*a*) several centers together could train more workers than one station, (*b*) quality did not suffer, (*c*) local interest was stimulated, and (*d*) cost was less.

Today, Florida and Texas are apparently the only States relying on a single training center. An exception exists with sanitarians, for whom the Communicable Disease Center of the Public Health Service has for some time maintained regional training centers.

When a local department is used for State training purposes, some special aid is usually extended by the State. This may be in the form of a lump sum increase in State aid, or of payment of a fee for each trainee, or of the assignment of extra personnel to the local staff.

Of the States with full-time directors of training, three States—California, Louisiana, and Massachusetts—have been stimulated and aided in development of training by grants from private foundations, either the Kellogg Foundation or the Commonwealth Foundation. Other States, including Michigan, Oklahoma, Tennessee, Texas, and Washington, have also had such aid. The laying of much of the groundwork in training was evidently due to this help from pioneering private agencies.

In California, Indiana, New York, Massachusetts, Michigan, and Ohio, the training office has also some responsibility in recruiting health workers for the department.

While schools of public health are active in formal training of health workers, many schools also contribute in a greater or lesser degree to extramural training or continuation education in the State or region where the school is located. Several schools of public health nursing also offer extension courses.

Some State departments of health are fortunate in receiving distinct aid in training from a nearby university. New Jersey has long been helped by Rutgers University, in both formal and short courses. Kansas, Kentucky, and Oklahoma also depend strongly on the State university. For a decade Florida has offered home study courses to local water works and sewage plant operators. Michigan in 1950 established the policy (*3*) of "limiting the department's sponsorship of training to those fields where the established educational institutions are unable to provide service." This expresses what most States are now doing. In Illinois the department of public health and the university conduct four correspondence courses in sanitation.

### Recommendations

Statistical evaluations in so wide a field are difficult, but as a result of this study my personal recommendations are as follows:

Training is a normal function of administration and should include service from the State to localities.



Every State department of health should have a training committee, preferably with members from local departments and from educational institutions whose major concern is with training policies.

Every State department of health should have one person designated as director or coordinator of training. In most States, he will devote part of his time to training and will be selected both for his interest in training and for the related nature of his other duties. In States with a larger number of State or local health workers, he should give his full time to training. Whether on a part-time or full-time basis, this person should work with others who will themselves do the actual training. He should use educational institutions wherever possible. He should preferably be a physician. His position in the department should be high enough to

exert influence. He should work and plan with the confidence that the ground swell is setting his way (4).

#### REFERENCES

- (1) U. S. Public Health Service. Division of Public Health Nursing Services: Annual census of nurses employed for public health work in the United States and Territories on January 1, 1953. Washington, D. C., The Service, 1953, table 3. Mimeographed.
- (2) Amos, F. B.: The public health training program of New York State. Pub. Health Rep. 68: 295-300, March 1953.
- (3) Michigan Department of Health: Public health recruitment and training. Fourth annual report. Ann Arbor, The Department, 1954, p. 5.
- (4) The State health department. An official statement of the American Public Health Association, adopted November 11, 1953. Am. J. Pub. Health 44: 235-252, February 1954.

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### PHS Staff Announcement

**Dr. Clifton K. Himmelsbach** was appointed chief, Division of Hospitals, Public Health Service, in March 1955. As chief of the division, he will have charge of all Public Health Service hospitals and outpatient clinics. With the Service since 1931, Dr. Himmelsbach had been assistant chief of the division until his recent appointment. Before then, 1948-53, he was in charge of the Washington, D. C., outpatient clinic, and,

earlier, chief of the Medical Operations Branch of the Federal Employee Health Program.

Included under Dr. Himmelsbach's direction is the Lexington, Ky., hospital for the treatment of narcotic addicts. At one point in his career, when he was assigned to the research branch of that hospital, Dr. Himmelsbach directed clinical investigations on the nature and quantification of narcotic addiction and the methods for detection of addiction liability in new drugs.

# Studies on Dental Care Services for School Children

—Third and Fourth Treatment Series, Woonsocket, R. I.—

By FRANK E. LAW, D.D.S., M.P.H., CARL E. JOHNSON, D.D.S.,  
and JOHN W. KNUTSON, D.D.S., Dr.P.H.

THE WOONSOCKET dental care study was designed to provide factual information on the problems of accumulated and maintenance dental service needs of school children in a fairly representative New England industrial town. Complete dental care, exclusive of orthodontics, was furnished all children enrolled in kindergarten through the ninth grade, provided treatment was requested by a parent or guardian. This long-term study, a cooperative project of the city of Woonsocket, the Rhode Island State Department of Health, and the Public Health Service, consisted of four consecutive treatment series. Study participants received in the course of each series an examination, a prophylaxis, topical fluoride applications, and treatment of dental defects. Data describing the organization and operation of the program and the results of the first and second treatment series have been previously reported (1). Performance

data descriptive of the third and fourth series are the subject of the present paper.

## Review of First Two Series

Examination findings disclosed that 84 percent of the participants in the first series had 1 or more permanent teeth needing filling; 22 percent had at least 1 missing permanent tooth; and 20 percent had 1 or more filled permanent teeth. In the 30 months required to complete the first series, the average child received 3.3 dentist man-hours of care. An average of 2.1 permanent teeth were treated per dentist man-hour.

Of children taking part in the second treatment series, 87 percent had 1 or more carious permanent teeth; 18 percent had 1 or more extracted permanent teeth; and 58 percent had at least 1 filled permanent tooth. The second series extended over a period of 24 months, with an average of 2.8 dentist man-hours devoted to each child. The number of permanent teeth treated per dentist man-hour averaged 1.9.

## Followup Program

A followup program for children whose parents had not requested treatment in the school

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*Dr. Law is regional dental consultant for Region III, Department of Health, Education, and Welfare; Dr. Johnson is a member of the staff of the Public Health Service Outpatient Clinic in New York City; and Dr. Knutson is chief dental officer of the Public Health Service.*

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clinic program was operated throughout the four series. Consisting largely of conferences with teachers and home visits, the program aimed at encouraging these parents to take their children to a private dentist regularly. Approximately 6 percent of the school population received care in private dental offices. Ten percent of the children would not accept treatment from any source during the period covered by this program.

### Clinic Routine

At the beginning of each series, teachers distributed "request for treatment" forms to all children regardless of whether or not they had previously participated in the study project. In each school, the entire student body was examined prior to the beginning of treatment. Every effort was made to keep the sequence of schools the same in all treatment series.

The first series was devoted exclusively to the correction of accumulated dental needs. The following rounds represented, therefore, a periodic treatment of accruing, or incremental, defects. For example, the fourth treatment series consisted largely of treatment of dental defects which had arisen since completion of the third, or preceding series. In addition to incremental defects, however, there was a continuing backlog of dental care needs reflecting

the new enrollment of children in school during each series. In the third treatment series, 1,123 children, or 23 percent of those receiving clinic care, fell into this category. In the fourth series, the 950 newly enrolled children constituted about one-fifth of the entire group treated in school clinics.

To measure and express the work load accurately, all teeth needing fillings, whether or not they had previously been filled, were counted as "carious." Also rated as carious were teeth indicated for extraction. The examination, recording, and treatment procedures utilized in the first two series (1) were continued throughout the program.

This report, like that on the first two series, is basically concerned with dental care services. Consequently, baseline and performance data apply only to those children participating in the school clinic program.

During the third treatment series, 5,975 children, or 98 percent of those enrolled in kindergarten through the ninth grade, were examined. Treatment was provided 82 percent of this group. In the fourth series, 6,201 children, or more than 99 percent of the school population, were examined. Of this group, 81 percent subsequently received dental treatment. The age distribution of children examined and their patient status for the final two treatment series are shown in table 1.

**Table 1. Age distribution of all children examined, by patient status, third and fourth treatment series, Woonsocket, R. I.**

Age last birthday	Third treatment series			Fourth treatment series		
	Patient status		All children	Patient status		All children
	Clinic	Private		Clinic	Private	
All ages.....	4, 912	1, 063	5, 975	5, 004	1, 197	6, 201
5.....	131	21	152	197	36	233
6.....	566	99	665	600	116	716
7.....	607	109	716	564	111	675
8.....	622	114	736	551	121	672
9.....	580	77	657	669	140	809
10.....	513	89	602	550	105	655
11.....	544	94	638	463	89	552
12.....	449	105	554	470	112	582
13.....	412	122	534	425	143	568
14.....	301	138	439	309	118	427
15.....	165	77	242	178	90	268
16.....	22	18	40	28	16	44

## Caries Prevalence

The annual increment of decayed permanent teeth, estimated from the difference in prevalence rates at individual ages, averaged 1.3 teeth per child. The proportion of children with one or more carious permanent teeth declined from 87 percent in the second round to 77 percent and 65 percent in the third and fourth rounds, respectively.

Age-specific rates for filled permanent teeth in the third series ranged from 0 at age 5 to 10.47 at age 15; in the fourth, from 0 to 11.18 for the same age groups (table 2 and figs. 1 and

2). At the beginning of the first series the corresponding rates were 0 to 2.33 teeth per child. For all age groups, the average frequencies for carious and missing permanent teeth per child dropped steadily from the first to the fourth series (table 3). At the same time, the number of filled teeth per child increased from 1.32 in the first series to 5.63 in the fourth. Only 20 percent of the children had one or more filled permanent teeth at the start of the program. In the third and fourth series, however, the proportion of children having filled teeth had increased to 70 and 74 percent, respectively.

**Table 2. Dental caries prevalence in permanent teeth of children, third and fourth treatment series, Woonsocket, R. I.**

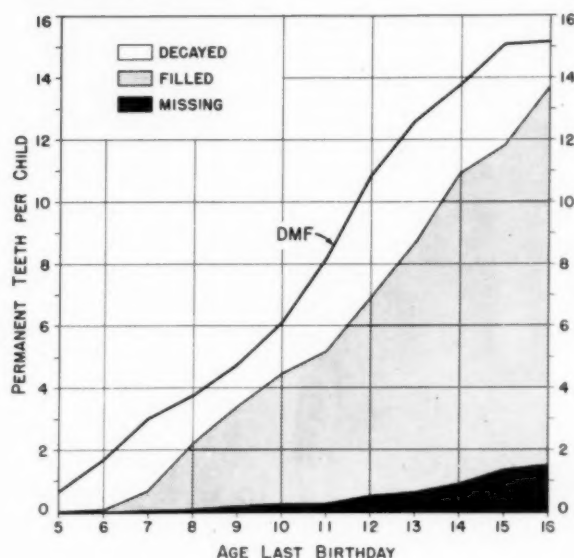
[Number of teeth per child]

Age last birthday	Cari- ous <sup>1</sup>	Filled	Cari- ous and/or filled <sup>2</sup>	Missing			DMF <sup>3</sup>	
				Total	Ex- tracted	Ex- trac- tions indicated		
5-16 <sup>4</sup>	Third treatment series							
	3. 37	5. 19	7. 54	0. 47	0. 43	0. 04	7. 97	
	. 66	. 00	. 66	. 00	. 00	. 00	. 66	
	1. 68	. 05	1. 70	. 01	. 00	. 01	1. 70	
	2. 55	. 64	2. 98	. 04	. 02	. 02	3. 00	
	2. 02	2. 15	3. 72	. 06	. 03	. 03	3. 75	
	2. 13	3. 22	4. 58	. 17	. 13	. 04	4. 71	
	2. 64	4. 19	5. 88	. 25	. 20	. 05	6. 08	
	4. 24	4. 49	7. 97	. 24	. 21	. 03	8. 18	
	5. 36	6. 38	10. 42	. 52	. 46	. 06	10. 88	
	5. 65	8. 07	12. 03	. 62	. 57	. 05	12. 60	
	4. 68	10. 02	12. 93	. 90	. 86	. 04	13. 79	
	5. 34	10. 47	13. 87	1. 36	1. 24	. 12	15. 11	
	3. 46	12. 18	13. 73	1. 50	1. 41	. 09	15. 14	
	5-16 <sup>4</sup>	Fourth treatment series						
		2. 28	5. 63	6. 98	0. 33	0. 30	0. 03	7. 28
		. 31	. 00	. 31	. 00	. 00	. 00	. 31
. 94		. 14	1. 04	. 00	. 00	. 00	1. 04	
1. 62		1. 22	2. 52	. 03	. 02	. 01	2. 54	
1. 47		2. 67	3. 56	. 06	. 05	. 01	3. 61	
1. 72		3. 31	4. 28	. 09	. 07	. 02	4. 35	
2. 06		4. 35	5. 52	. 19	. 16	. 03	5. 68	
2. 87		5. 42	7. 26	. 22	. 20	. 02	7. 46	
3. 37		7. 23	9. 27	. 32	. 27	. 05	9. 54	
3. 28		8. 93	10. 90	. 52	. 47	. 05	11. 37	
3. 65		10. 66	12. 48	. 79	. 72	. 07	13. 20	
3. 26		11. 18	12. 76	1. 06	. 98	. 08	13. 74	
2. 82		12. 43	13. 82	. 64	. 64	. 00	14. 46	

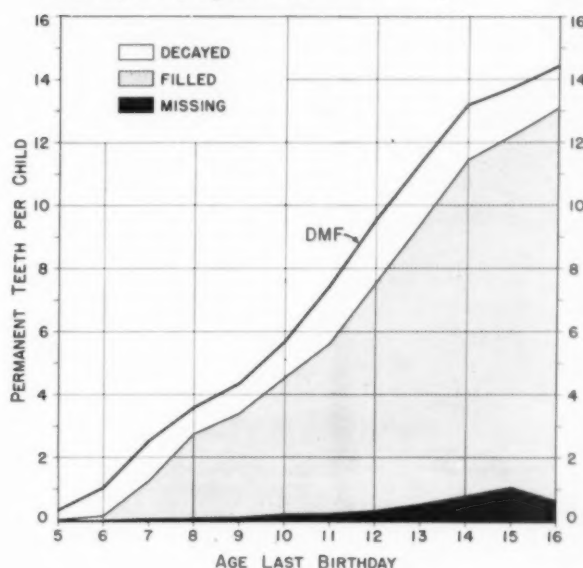
<sup>1</sup> Includes teeth carious only, those both carious and filled, and those indicated for extraction. <sup>2</sup> Based on actual number of teeth carious, filled, or carious and filled. Teeth that are both carious and filled are counted only once. <sup>3</sup> Decayed, missing, and filled. <sup>4</sup> Average of the rates for ages 5-16.



**Figure 1. Dental caries prevalence in permanent teeth, third treatment series, Woonsocket, R. I., ages 5-16.**



**Figure 2. Dental caries prevalence in permanent teeth, fourth treatment series, Woonsocket, R. I., ages 5-16.**



Waterman and Knutson (2) point out in a report on a comparable study project in Richmond, Ind., that "continued reduction of the number of teeth indicated for extraction reflects the regularity of complete care during the previous treatment series." This indication of the value of complete and continuing care in saving teeth is supported by the Woonsocket experience. More than 10 times as many permanent teeth per child were indicated for extraction at the start of the first series as in the fourth series (table 3). During the same interval the number of teeth that had been extracted decreased by more than 50 percent. Eleven percent of the children in the fourth series had 1 or more

extracted teeth, compared with 22 percent in the first.

Initial examination findings revealed that 47 percent of all primary teeth were carious. In addition, only 4 percent of the children had 1 or more primary teeth which had been filled prior to the first treatment series. Improvement in the status of the primary dentition was observed with each succeeding treatment series. The proportion of decayed primary teeth, for example, decreased to 33 percent in the fourth series, whereas that of children with filled primary teeth increased to 36 percent. For the first three series the average number of carious primary teeth per child was highest in 6-year-

**Table 3. Average dental caries prevalence in permanent teeth of children aged 5-16, four treatment series, Woonsocket, R. I.**

[Number of teeth per child]

Treatment series	Cari-ous	Filled	Cari-ous and/or filled	Missing			DMF <sup>1</sup>
				Total	Extracted	Extraction indicated	
1	6.39	1.32	7.09	0.99	0.66	0.33	7.76
2	5.30	3.87	7.84	.77	.66	.11	8.50
3	3.37	5.19	7.54	.47	.43	.04	7.97
4	2.28	5.63	6.98	.33	.30	.03	7.28

<sup>1</sup> Decayed, missing, and filled.

**Table 4. Dental caries prevalence in primary teeth of children, third and fourth treatment series, Woonsocket, R. I.**

[Number of teeth per child]

Age last birthday	Cariou <sup>1</sup>	Filled	Cariou and/or filled <sup>2</sup>	Extractions indicated
Third treatment series				
5-16 <sup>3</sup>	2.21	0.68	2.73	0.36
5	5.95	.63	6.38	.63
6	6.19	.71	6.64	1.02
7	4.62	1.87	6.08	.78
8	3.18	2.51	5.24	.50
9	2.85	1.54	4.08	.50
10	2.03	.66	2.50	.43
11	1.11	.21	1.27	.27
12	.36	.06	.39	.10
13	.08	.01	.09	.04
14	.05	.00	.05	.01
15	.02	.01	.02	.01
16	.05	.00	.05	.05
Fourth treatment series				
5-16 <sup>3</sup>	2.04	1.04	2.84	.24
5	6.91	.69	7.35	.79
6	5.78	1.18	6.62	.67
7	3.67	3.04	6.08	.45
8	2.56	3.21	5.20	.30
9	2.36	2.59	4.37	.19
10	1.74	1.20	2.64	.21
11	.91	.40	1.20	.10
12	.37	.10	.43	.09
13	.11	.03	.13	.02
14	.04	.02	.05	.01
15	.02	.01	.03	.00
16	.00	.00	.00	.00

<sup>1</sup> Includes teeth carious only, those both carious and filled, and those indicated for extraction. <sup>2</sup> Based on actual number of teeth carious, filled, or carious and filled. Teeth that are both carious and filled, are counted only once. <sup>3</sup> Average of the rates for ages 5-16.

old children, whereas in the fourth series, the 5-year-old group had the highest average (table 4). At the beginning of the program 8-year-old children averaged 0.29 filled primary teeth. In the fourth series, however, this figure had risen to 3.21 primary teeth per child—a tenfold increase.

Only children aged 10 years or over in the fourth series could have received treatment in the three preceding rounds. To emphasize the improvement in dental status resulting from regular care, one may compare the findings of the initial and the fourth examination for

10-year-old children, recognizing at the same time that the group involved in the fourth series also included newly enrolled individuals. At the beginning of the program the average 10-year-old had 5.30 carious, 0.83 filled, and 0.61 missing permanent teeth. In the fourth treatment series, on the other hand, the corresponding averages for children of the same age were 2.06, 4.35, and 0.19. These figures indicate that 10-year-old children in the fourth series had less than half as many carious, five times as many filled, and one-third as many missing permanent teeth as those of similar age in the first series.

Similarly, initial examination of the 14-year-old group showed 10.7 carious, 2.91 filled, and 2.21 missing permanent teeth per child. By contrast, the average 14-year-old in the fourth series had 3.65, 10.66, and 0.79 teeth in the carious, filled and missing categories, respectively. This represented one-third as many decayed, nearly four times as many filled, and one-third as many missing permanent teeth as were observed in children of this age at the start of the program.

#### Treatment Provided

Over 99 percent of the children treated in the school clinics during the third and fourth series received complete dental care, exclusive of orthodontics. Seventy-seven percent of those participating in the third series and 65 percent of those in the fourth round received fillings in 1 or more permanent teeth. These figures represent a considerable decline from the corresponding proportion noted in the second series—87 percent. The overall average of 0.32 permanent tooth per child extracted in the first series was reduced to 0.07 and 0.05 in the last two series (table 5.)

The major portion of care of the primary teeth was received by the 5-8-year group. The number of primary teeth filled for these children was essentially similar throughout the last three rounds, averaging about 2.49 teeth per child per series. This figure, compared with the average of 0.19 tooth per child for this group during the first round of treatment indicates a notable increase in care of the primary teeth. This increase was made possible by the large

**Table 5. Dental treatment to permanent and primary teeth of children, third and fourth treatment series, Woonsocket, R. I.**

[Number of teeth per child]

Age last birthday	Permanent teeth			Primary teeth		
	Filled	Filled surfaces	Extracted	Filled	Filled surfaces	Extracted
Third treatment series						
5-16 <sup>1</sup> .....	3. 24	4. 90	0. 07	0. 88	1. 76	0. 42
5.....	. 62	. 91	. 00	3. 72	7. 59	. 68
6.....	1. 65	2. 54	. 01	3. 64	7. 30	1. 08
7.....	2. 50	3. 90	. 03	2. 32	4. 56	. 87
8.....	2. 00	3. 07	. 03	. 80	1. 56	. 58
9.....	2. 05	3. 20	. 05	. 06	. 11	. 57
10.....	2. 59	3. 72	. 07	. 01	. 01	. 53
11.....	4. 15	5. 72	. 07	. 01	. 01	. 41
12.....	5. 22	7. 51	. 12	. 00	. 00	. 22
13.....	5. 50	8. 12	. 08	. 00	. 00	. 08
14.....	4. 40	6. 76	. 08	. 01	. 02	. 04
15.....	4. 76	7. 50	. 15	. 00	. 00	. 04
16.....	3. 41	5. 91	. 09	. 00	. 00	. 05
Fourth treatment series						
5-16 <sup>1</sup> .....	2. 19	3. 48	0. 05	0. 84	1. 82	0. 32
5.....	. 30	. 43	. 01	3. 71	8. 24	. 90
6.....	. 95	1. 38	. 00	3. 41	7. 49	. 78
7.....	1. 60	2. 43	. 01	1. 95	4. 03	. 53
8.....	1. 45	2. 22	. 02	. 88	1. 85	. 40
9.....	1. 69	2. 64	. 03	. 07	. 16	. 31
10.....	2. 00	2. 96	. 04	. 01	. 02	. 34
11.....	2. 81	4. 08	. 03	. 00	. 00	. 21
12.....	3. 31	5. 91	. 07	. 00	. 00	. 15
13.....	3. 14	4. 90	. 06	. 00	. 00	. 07
14.....	3. 49	5. 93	. 15	. 00	. 00	. 06
15.....	2. 91	4. 96	. 11	. 00	. 00	. 03
16.....	2. 68	3. 96	. 04	. 00	. 00	. 00

<sup>1</sup> Average of the rates for ages 5-16.

number of children on a maintenance basis upon completion of the first treatment series. The practicability of this approach is suggested by the continued decrease in primary teeth indicated for extraction in succeeding treatment series. Each primary tooth filled involved an average of 2 surfaces, compared with 1.5 surfaces for each permanent tooth. This pattern showed little variation throughout the program.

Additional treatment included 754 pulp cappings and 94 vital partial pulpectomies in permanent and primary teeth during the third round. The corresponding numbers for the fourth series were 815 and 86.

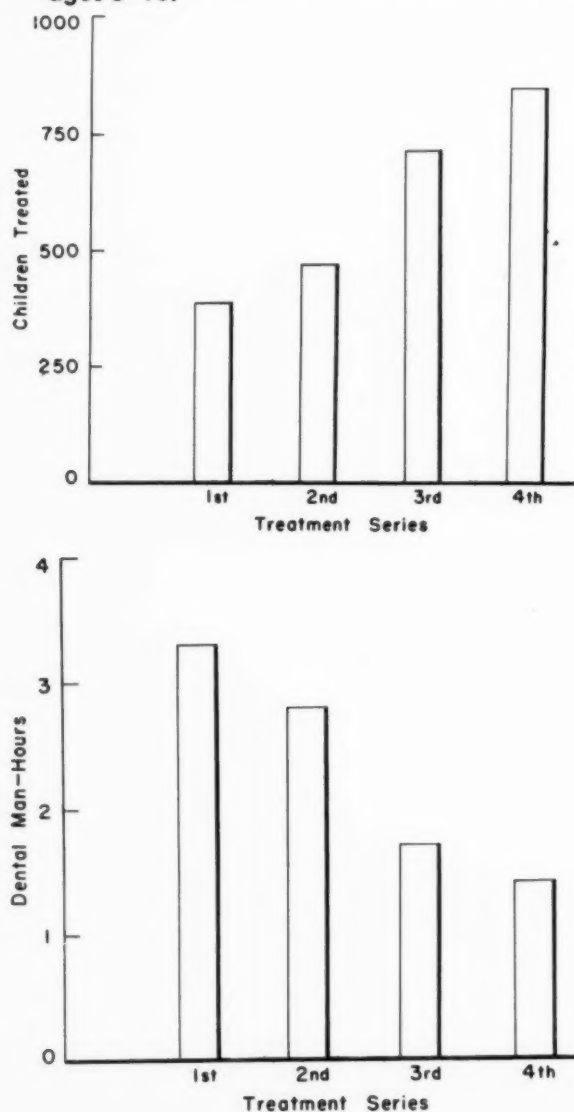
#### Dentist Man-Hours

During the 15 months required to complete the third treatment series, an average of 5.5 dentists were on duty, or a ratio of 1 dentist to 714 children per year. Complete treatment of each child required 1.7 dentist man-hours. An average of 1.9 permanent and 0.6 primary teeth were filled per dentist man-hour in addition to the miscellaneous treatments provided. During the fourth series, 5,004 children were treated by an average of 5.9 dentists, a ratio of 1 dentist to 848 children per year. During this series an average of 1.4 dentist man-hours was required for each completed case. For each dentist man-

hour, an average of 1.6 permanent and 0.7 primary teeth were filled. Table 6 summarizes the ratio of clinic to nonclinic patients; children treated per dentist; dentist man-hours per child; and teeth filled per dentist man-hour during the four series.

The number of teeth filled per dentist man-hour remained essentially constant in all four rounds. The effect of regular, complete dental care in reducing the needs for dental service is indicated by the increased number of children treated annually per dentist and the decrease in

**Figure 3. Children treated annually per dentist and dental man-hours per completed case, four treatment series, Woonsocket, R. I., ages 5-16.**



**Table 6. Selected comparative data for the four treatment series, Woonsocket, R. I., children aged 5-16**

Comparative data	Treatment series			
	1	2	3	4
Patients-----	6,848	6,107	5,975	6,201
Clinic-----	5,944	5,189	4,912	5,004
Nonclinic-----	904	918	1,063	1,197
Children treated per dentist-----	384	470	714	848
Dentist man-hours per child-----	3.3	2.8	1.7	1.4
Teeth filled per dentist man-hour-----	2.4	2.6	2.5	2.3
Permanent-----	2.1	1.9	1.9	1.6
Primary-----	.3	.7	.6	.7

dentist man-hours required to complete each case (fig. 3 and table 6). This continued reduction in need was also reflected in a steady decline in the overall time required to complete succeeding treatment series.

#### Summary of All Four Series

Over 80 percent of the total enrollment in kindergarten through the ninth grade, or an average of 5,100 school children, received complete dental care in each of the four treatment series of the Woonsocket dental care study. In addition, a small number participated to the extent of receiving partial clinic care. Six percent of the children were cared for regularly by their own dentists, whereas about 10 percent sought no care from any source.

The initial examination disclosed an average of 6.39 carious, 1.32 filled, and 0.99 missing permanent teeth per child for all age groups 5-16 years. During the fourth treatment series the corresponding rates were 2.28, 5.63, and 0.33 teeth per child.

Although care of the primary teeth was selective rather than complete, the filled tooth rate per child for children aged 5-8 years increased from an average of 0.19 teeth in the first series to 2.49 in the final series.

The effect of regular, complete dental treatment in reducing dental needs is indicated by the greater number of children treated annually per dentist, as well as by the decreased dentist



time required to complete each case. Whereas each dentist cared for 384 children during a year in the first series, he was able to extend his services to 848 patients by the fourth round. Only 1.4 dentist man-hours were needed to complete treatment per child in the final series, in contrast to the 3.3 man-hours in the first series. This figure includes the time required to care for the backlog needs of newly enrolled children who had not previously been treated in the program.

The number of months devoted to completing

each of the treatment series was 30, 24, 15, and 12, respectively.

#### REFERENCES

- (1) Law, F. E., Johnson, C. E., and Knutson, J. W.: Studies on dental care service for school children—First and second treatment series, Woonsocket, R. I. Pub. Health Rep. 68: 1192-1198, December 1953.
- (2) Waterman, G. E., and Knutson, J. W.: Studies on dental care services for school children—Third and fourth treatment series, Richmond, Ind. Pub. Health Rep. 69: 247-254, March 1954.

## *An Important Date*



Each month your health department and many hospitals, laboratories, schools, clinics, and homes receive a copy of PUBLIC HEALTH REPORTS, mailed to arrive on the 20th, or even earlier, depending upon geographic location of the subscriber.

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Venereal Disease in Teen-agers  
Ownership of Nursing Homes  
The Trachoma Story  
Medical Librarianship  
A Rural Sanitation Program  
Hospital Beds in the United States

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# research progress report

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## Germ-Free Amebiasis Studies

*This report on progress of germ-free amebiasis research being conducted by the University of Notre Dame and the Public Health Service is based on a paper presented by Bruce P. Phillips at the annual meeting of the American Society of Parasitologists, at Memphis, Tenn., November 4, 1954. Mr. Phillips is a medical protozoologist with the National Microbiological Institute of the Service.*

**C**ONVENTIONAL animal experimentation as a key resource in the study of infectious diseases has certain inherent shortcomings. Among them are interference by rival organisms in the animal. An investigator working with a given disease organism in a laboratory animal usually must consider the possible effects of other micro-organisms normally present or accidentally introduced. He must ask if his results are influenced, directly or indirectly, by bacteria normally harbored by the animal, bacteria which in themselves do not ordinarily produce disease.

### Germ-Free Animals

To eliminate such uncertain or unpredictable factors is the object of what is known as germ-free medical research. For this work, great pains have been taken to rear and make available for experimental use small laboratory animals—chickens, guinea pigs, or mice—which are free of the bacteria harbored by conventional or “contaminated” animals.

Scientists first attempted to rear germ-free animals—chickens—in 1897. Contamination occurred within the first few days. The investigators concluded that it is practically impos-

sible to free the egg surface from bacteria, and that chickens are therefore unsuitable for germ-free studies. Nevertheless, another scientist, Schottelius, persevered. After 9 years, he reported, he raised about 30 germ-free birds; some remained germ-free for as long as 30 days. But his germ-free birds sickened and died, whereas others which he deliberately contaminated after a short period developed normally. He concluded that intestinal bacteria are indispensable to the nutrition of vertebrates.

Soon after, these conclusions were refuted. Cohendy in 1912 reported rearing 17 healthy germ-free chickens for as long as 40 days.

After a lapse of nearly 25 years, Balzam in 1937 reported he had reared 5 healthy chickens for 59 days, germ-free, for an experiment with nutrition. He concluded that intestinal bacteria had no appreciable influence on the digestibility of food in the chicken.

Chickens have proved particularly appropriate for germ-free breeding. The chick feeds itself from birth. It needs fewer caretakers than the mammals. Advanced knowledge of its genetic and embryonic history is also an advantage to research.

The first long-term program to rear germ-free animals began in 1928 at the University of

Notre Dame. This attempt to resolve the many complex problems of creating and maintaining a sterile environment for germ-free animals drew on resources of mechanics, engineering, physics, chemistry, and biology. The bacteriological triumph gave rise to a specialty known as biological engineering, which designed the instruments and apparatus of the project. Only by these applied skills was it possible to put germ-free animal breeding on a practical basis. Trained technicians were enabled by ingenious equipment to relieve highly trained research personnel of the routine feeding and management of the animals.

The objective at Notre Dame was to introduce an animal, germ-free at birth, into a sterile environment, and to maintain it and its progeny germ-free. The feat required that the animal be isolated from germs in its living quarters, its air, its food, and all its other contacts.

Early attempts to achieve this end depended on a series of steps, each using germ-free apparatus with aseptic technique. Since any one step was a weak link in the chain, Notre Dame devised a system of total control. The entire apparatus for moving the animals, cleaning cages, and handling food is sterilized at one time under steam pressure.

This achievement at Notre Dame, under the leadership of Dr. James A. Reyniers, has been followed with deep interest by scientists in many research institutions. At the National Institutes of Health of the Public Health Service, the availability of germ-free animals led to the initiation of a study 2 years ago by the National Microbiological Institute's Laboratory of Tropical Diseases, in cooperation with the University of Notre Dame.

### **Amebiasis Study**

The problem selected for study at the National Institutes of Health was a widespread intestinal infection known as amebiasis. Many will remember the serious outbreak of this disease in Chicago during the World's Fair 20 years ago. Amebic infection is common in the United States. It is found in an estimated 7 percent of our population.

Amebic dysentery has long been viewed as a clinical anomaly, in that it presents an unusually

wide and varied range of manifestations. To explain these variations, studies were devised to investigate the agent of this disease and its capacity to produce infection. Among them have been studies to determine the effects of inoculation of germ-free animals with amebas which are themselves free of bacterial contamination.

### **Germ-Free Amebas**

These studies were proposed because the initial attack of this disease agent usually occurs in the lower intestinal tract, where it lives with a large number of species of bacteria. It had never been possible for the ameba to be grown in the test tube without the presence of bacteria until a scientist in the National Microbiological Institute succeeded in cultivating the ameba in bacteria-free cultures of a South American trypanosome.

Two groups of animals were used for inoculation with the germ-free ameba: germ-free guinea pigs and conventional guinea pigs. Both groups were maintained on identical sterilized rations.

None of the 35 germ-free animals developed amebic lesions before they were sacrificed on the 33d day. Of the 37 conventional animals inoculated as controls, 34 developed ulcerative amebic disease, and the remaining 3 were shown to harbor the infecting agent when sacrificed on the 21st day.

In contrast to these results, 2 series of pre-experimental germ-free animals were fed by mouth single species of common intestinal bacteria before being inoculated with bacteria-free ameba. All of these animals developed acute amebic diseases with typical lesions.

### **Bacterial Effect**

These results offered first concrete evidence that bacteria have a role in the experimental production of disease by the ameba. In relation to amebic disease in humans, the evidence suggests a possible explanation for the disparities frequently noted in clinical manifestations and in effects of treatment of amebic dysentery.

This study, made possible by the use of Notre Dame's germ-free animals and facilities, repre-

sented an expenditure by the National Institutes of Health of only \$21,000.

The National Microbiological Institute, the National Institute of Arthritis and Metabolic Diseases, and the National Institute of Dental Research have plans for additional germ-free studies.

At the Microbiological Institute, new knowledge is sought about the multitude of infecting agents that assault the tissues of man. Germ-free studies aid in this task, for they supply a method and a freedom from bacterial interference heretofore lacking.

Germ-free animals may be useful in investigating the site of multiplication of the poliomyelitis virus in the intestinal tract and the influence on its multiplication and excretion.

Another project would study resistance of germ-free animals to infection with such agents as staphylococci. This is of interest to clinical medicine because staphylococci, once they become resistant to antibiotic drugs, may cause severe complicating secondary infections.

Other studies may determine whether certain fungi and yeasts become pathogenic, or disease producing, if the effect of bacterial growth in the respiratory and gastrointestinal tracts is eliminated.

The hope is that germ-free techniques have reached the stage where they can be applied to the study of a wide variety of complex biological problems, as evidenced 70 years ago by Pasteur.

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### **New Juvenile Delinquency Division in Children's Bureau**

With the establishment of a Division of Juvenile Delinquency, the Children's Bureau of the Department of Health, Education, and Welfare will increase its services to public and private agencies and to organizations concerned with the nationwide problem of juvenile delinquency. The new division will work closely with existing programs of the Children's Bureau to extend and improve its health and welfare services for physically, socially, and emotionally handicapped children.

Philip Gordon Green, former chief juvenile probation officer of the Juvenile Court of San Francisco, will direct the division. Associated with him will be William H. Sheridan as chief of the Technical Aid Branch, Mrs. Elliot Turner Studt as chief of the Training Branch, and Donald George Blackburn as consultant on institutions for delinquent youth. Specialists on juvenile police, courts and probation services, and community services are to be appointed.

The Children's Bureau is also expanding its study program and statistical reporting on children who come to the attention of the courts.



## Roof Rats in Southwest Georgia

Two rodent species of the genus *Rattus* (*R. norvegicus* and *R. rattus*) have played important roles in the transmission of some of the earth's most serious diseases. The control of these rodents and of their ectoparasites has proved an effective means of combating these diseases. However, efficient control of rodents and/or their ectoparasites requires a thorough understanding of the animal's life history and habits.

Many good studies have contributed to a sound understanding of Norway rat populations, but the works are few which analyze the population dynamics of roof rats. The Georgia studies made efforts to increase understanding of the phenomena of the habits and population of roof rats. It is hoped that the reported findings will lead to more efficient control of roof rats and to a greater reduction in the diseases transmitted by this species.

The objectives of the study were (1) to determine the basic population units and the factors responsible for their well-being, (2) to develop methods for observing and detecting changes in density of rat populations, (3) to analyze mortality rates from catch-mark-release data, (4) to determine movement rates and distances traveled, and (5) to learn the extent to which rats maintain a feral existence.

The study was conducted in Brooks, Thomas, and Grady counties, Ga., from June 1951 through January 1953. Rats were live-trapped, marked, and released in five rural study areas. Trapping and marking methods are described. Some additional data were gathered from the steel trapping records of murine typhus surveillance programs.

Typical habitat and basic living requirements are described. Population changes are analyzed by comparison of trap-catch rates, by change in colony distribution, by farmer and

trapper recollection, and by changes in age distribution. All methods of analysis point in the direction of a reduced rat population between 1947 and 1953.



### Public Health MONOGRAPH

#### No. 27

The accompanying summary covers the principal findings presented in Public Health Monograph No. 27, published concurrently with this issue of Public Health Reports. The author, formerly a wildlife research biologist with the Public Health Service Communicable Disease Center, is a public health biologist with the Santa Clara County (Calif.) Health Department.

Readers wishing the data in full may purchase copies of the monograph from the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C. A limited number of free copies are available to official agencies and others directly concerned on specific request to the Public Inquiries Branch of the Public Health Service. Copies will be found also in the libraries of professional schools and of the major universities and in selected public libraries.

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Ecke, Dean H.: Roof rat populations in southwest Georgia. Public Health Monograph No. 27 (Public Health Service Publication No. 373). 20 pages. Illustrations. U. S. Government Printing Office, Washington, D. C., 1955. Price 20 cents.

Mortality rates computed from retrapping data show that females live longer than males, and that over 95 percent of any given population could be expected to die within 12 months. A distinction is made between "disappearance rates" as directly observed in trapping records and "true mortality" rates. It is also shown that males attain greater size than females.

Rat movement was found to be quite restricted. Of 546 rats retrapped, only 4 were taken at distances greater than 500 yards from

their original capture site. Twelve percent of captured rats moved between buildings at distances under 300 yards, and individual moves over 100 yards were rare.

No evidence could be found to substantiate local beliefs that rats migrated between fields and farm buildings during seasonal changes. Data from field trapping, absence of rat sign in fields, and stomach analyses of foxes combine to discount any appreciable population of feral rats in the vicinity of study.

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## technical publications

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### **A Comprehensive Program for Water Pollution Control**

#### **The Minnesota River Basin**

*Public Health Service Publication No. 365 (Water Pollution Series No. 64). 1954. 26 pages; map and tables.*

#### **The Rainy River Basin**

*Public Health Service Publication No. 380 (Water Pollution Series No. 68). 1954. 6 pages; map and tables.*

The Minnesota River Basin and the Rainy River Basin pollution control programs are summarized in these two publications of the water pollution control series.

The Minnesota River Basin consists of a watershed area of about 16,920 square miles, located in southwestern Minnesota, South Dakota, and Iowa. The principal tributaries are the Little Minnesota, Chippewa, Cottonwood, Redwood, Lac Qui Parle, Pomme de Terre, and Yellow Medicine Rivers. To protect the water of the basin against pollution, the report recommends construction of 64 new or enlarged municipal sewage treatment plants to serve about 100,000 people, plus new or improved waste treatment facilities at 19 industrial plants.

The water pollution control program for the Minnesota River Basin has been developed jointly by the water pollution control agencies of Iowa, Minnesota, and South Dakota with the cooperation of Federal water pollution agencies.

The Rainy River Basin lies in Ontario and in the north central part of Minnesota. The river forms a portion of the boundary between Canada and Minnesota and drains an area of approximately 21,000 square miles, 11,300 of which are in Minnesota.

The water pollution control program for the portion of the Rainy River Basin within the United States has been developed and put into operation by the Water Pollution Control Agency of Minnesota, which had the cooperation of other authorities during the planning period.

### **Health Manpower Source Book**

#### **Medical Record Librarians**

*Public Health Service Publication No. 263. Section 6, 1954. By Maryland Y. Pennell, Marion E. Altenderfer, and Olive G. Johnson. 43 pages; tables. 30 cents.*

This sixth section of the health manpower source book series pre-

sents data on the number, characteristics, and distribution of medical record librarians. A survey by the American Association of Medical Record Librarians in 1953 gave information on employment status and educational background. Additional material was obtained from the association files and from the approved schools for the training of medical record librarians.

About 13 percent of the active medical record librarians have been graduated from approved schools for training in that field. In 1953-54, the 24 approved schools had a student capacity of 219 and an enrollment of 114. Of the 1,152 persons graduated from accredited schools during the period 1928-53, almost half are currently active in their profession.

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This section carries announcements of all new Public Health Service publications and of selected new publications on health topics prepared by other Federal Government agencies.

Publications for which prices are quoted are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington 25, D. C.

The Public Health Service does not supply publications issued by other agencies.

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*The twin problem of encouraging foreign trade while protecting the health of the Nation . . . Shellfish, in the shellfish sanitation control program of the Public Health Service, are defined as "fresh or frozen oysters, clams, and mussels."*

## Shellfish Importation into the United States

By RICHARD S. GREEN, M.S.

IMPORTATION of shellfish presents several complex sanitation problems to health and food control officials, as well as to industry. The program of shellfish sanitation control of the Public Health Service is based on the endorsement of State operations. The listing of certified dealers in a periodic compilation, designed for use in consumer areas, is the backbone of this voluntary system of control. Since 1948, Canada and the United States have operated under an agreement to use this technique for shellfish shipped across the border.

The acceptance of this concept of the certification system and an understanding of the health department surveillance involved in it brought about demands for similar attention to the growing volume of shipments of shellfish from other countries. Since many health services in the United States require that oysters, clams, and mussels be purchased from certified

dealers, shipments from foreign countries other than Canada have found a restricted market, even though they have been admitted legally to the country under the terms of the Federal Food, Drug, and Cosmetic Act (1). The Food and Drug Administration is responsible for permitting or denying entry to food imports under that act.

Representatives of foreign countries and United States importers have asked the Public Health Service how their shellfish can be accepted in a manner similar to domestic and Canadian shellfish. At the same time, State and local health departments have asked the Service what they should do about foreign shellfish which have appeared on the market. The Public Health Service, although it has guided the domestic control program for many years, has no legal jurisdiction in this issue. Since the shellfish sanitation program was developed, and still functions, through cooperation among the States, industry, and the Public Health Service, major adjustments in the program must be worked out by agreement among these interested parties.

As indicated above, responsibility for permitting or denying entry of shellfish shipments when presented at ports of entry, under the terms of the Food, Drug, and Cosmetic Act, lies with the Food and Drug Administration, a companion agency of the Public Health Service in the Department of Health, Education, and

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*Mr. Green, chief of the Shellfish Branch from July 1947 to November 1954, is now chief of the Facilities Protection Project, Water Supply and Water Pollution Control Program, Division of Sanitary Engineering Services, Public Health Service. This paper is based on comments presented at the Joint Convention of the Oyster Institute of North America and the National Shellfisheries Association, Boston, August 4, 1954.*

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Welfare. Whenever the Food and Drug Administration finds, from the examination of samples, or otherwise, that such shipments of shellfish are insanitary, adulterated, or misbranded, their entry is refused. In the absence of such evidence, entry must be permitted.

#### **The Concept of Control at Source**

It is generally agreed that, in the instance of oysters, clams, and mussels, protection of the consumer is best assured by sanitary controls over conditions attending the growing, harvesting, packing, and shipping of the shellfish. This principle of "control at source" has governed the cooperative domestic shellfish program of the Public Health Service, the States, and industry. It is employed also in the agreement with Canada. Its value may be judged by the low incidence of shellfish-borne enteric disease, despite the more than 400 polluted areas on our coastlines that are legally closed to shellfish harvesting.

Objective examination of samples collected from foreign shellfish shipments on their arrival at an American port does not always give satisfactory evidence as to the conditions under which the shellfish were produced and packed. It is, therefore, difficult to decide which shipments should be admitted and which denied entry, particularly when bacteriological findings do not show presence of significantly large numbers of coliform organisms, and when other objective findings are satisfactory.

Prior to World War II, few shipments of shellfish came into the United States except from Canada and Mexico. Most of the shipments from Mexico were pismo clams (*Tivela stultorum*), although an occasional shipment of shucked oysters was offered for entry. In 1952 somewhat over a half million pounds of clam meats were imported from Mexico, principally through the San Diego and Los Angeles ports of entry. In 1953 this figure was close to three-fourths of a million pounds. It is believed that almost all of these clams are used in production of heat-processed clam chowder; since no apparent attempt has been made to distribute unprocessed clams beyond the State of entry, the question of certification of clam producers in Mexico has not arisen.

With expansion of the frozen food industry since the end of World War II, several other foreign countries have developed an interest in the United States market for bivalve shellfish, principally frozen clams. Japan, Iceland, Australia, The Netherlands, France, Spain, China, and Panama have all exported or indicated an interest in exporting frozen clams, mussels, or oysters to the United States. The total volume of shellfish shipped here has been relatively small, somewhere in the neighborhood of 1 or 2 percent of domestic production. However, foreign shellfish, except those produced in Canada, have been faced with the restrictions resulting from lack of certification. It is uncertain what the ultimate volume of shellfish imports might be if such restrictions were overcome.

#### **The Case for International Trade**

Although it is outside the usual field of public health to dwell on such facts as dollar exchange value, tariffs, and the importance to these foreign governments of trade with the United States, these factors bear directly on the regulatory problem. Specialists in such matters have analyzed the situation about as follows:

International trade in frozen shellfish, thanks to technical advances, is now possible on a worldwide basis. Producers of shellfish in distant countries are eager to help to satisfy what appears to be an expanded demand for shellfish in the United States. The interest of foreign governments stems from the importance of trade to their national economies and the importance that all free world countries attach to close ties with the United States. It is held to be in our interest to foster such ties and to enable friendly countries to gain strength through trade. Their welfare and ours are said to require that they be able to earn dollars from their exports to the United States in order to buy the products of our farms and factories.

Japan and Iceland, in particular, must sell the United States more goods than they now do to pay for American products they need and want. Iceland has virtually nothing except marine products to sell abroad, and marine products are among the few commodities which



Japan can produce without the use of imported raw materials.

In the last few years, the Governments of Iceland, Japan, The Netherlands, and Australia have made known to the Department of State and to the Public Health Service their interest in working out some arrangements which would remove unnecessary restrictions against the marketing of imported shellfish without endangering public health. As the Department of State has asserted America's interest in this problem, the Public Health Service has examined available facts with respect to the issue of expanding the present system of certification to these and other foreign countries.

The Public Health Service does not want its cooperative system of shellfish sanitation control within the United States to act as an artificial trade barrier against legitimate shellfish shipments which have been produced and packed under conditions equal to those required of American packers. On the other hand, even if the Public Health Service had the authority to do so—which it does not—there are difficulties in extending this certification system to other countries. Full knowledge of these difficulties is necessary in order to deal with the problem intelligently.

### **The Complexity of Foreign Control**

Public Health Service endorsement of State shellfish sanitation programs presumes that representatives of the Service keep in close touch with control measures of the individual producing States by reasonably frequent consultations with State personnel, cooperative investigations, and check inspections. Without this kind of contact, the Public Health Service could not report adequately to the country as a whole on the effectiveness of the local procedures. The agreement with Canada specifically includes provisions for the exchange of information on methods of production and handling of shellfish, and for inspection visits across the border.

From a practical point of view, it has been easy for the Public Health Service to meet these provisions of the agreement with Canada. The capitals of the two countries are only a few hours apart by air, and long distance telephone conversations are relatively inexpensive.

It costs the United States Government a very small sum each year to keep in close touch with operations in the Canadian Maritime Provinces of eastern Canada and in British Columbia, by extending routine field trips to those areas while Public Health Service inspectors are working in the State of Maine or the State of Washington. Health officials in the two countries have many mutual concerns; thus, official business easily includes shellfish sanitation along with other topics, and a constant interchange of information is possible at relatively low cost. In addition, cooperative efforts with Canada have been built on a long history of parallel development in the two countries, both as to technical procedures and administrative operations.

There are no provisions in the Food, Drug, and Cosmetic Act which would make possible routine international exchange of information about techniques of sanitation control at source. There is no provision for setting up any plan of international certification or endorsement of any foreign control program. In the view of officials of the Food and Drug Administration, the only justification under the Food, Drug, and Cosmetic Act for that Administration to use its appropriated funds to send a representative to a foreign country would be to gain information considered necessary for the proper enforcement of the act in connection with foods or drugs offered for entry into the United States.

Such visits have been rare for various reasons. In the first place, a single trip to a foreign country for inspection purposes can develop information of only limited usefulness. In order to carry out the type of inspections performed in this country under authority of the Federal Food, Drug, and Cosmetic Act, it is sometimes necessary to visit one or more plants several times during the year. Because of limitations of funds and personnel, such trips to foreign countries have limited value for control purposes. Compared with the expenditure on inspections in this country, they are also uneconomic, although occasions may arise when a single trip or visit to a foreign country may supply basic information necessary to evaluate a particular situation.

Aside from the complicated administrative problems, certain other factors are important.

There are limitations to the objective ex-

amination of shellfish at the time of arrival of shipments in this country. If strongly positive bacteriological results are obtained, one may assume that the shellfish were produced or handled under insanitary conditions. However, when bacteriological results are negative, interpretation becomes much more difficult.

In spite of a great deal of research, there has not been established for even our own species of shellfish any firm relationship between bacterial content of shucked shellfish in the market and the quality of growing areas and conditions of handling. This is why it is not yet possible to adopt a final bacteriological standard for market quality. Work which has been done so far in this field has dealt chiefly with fresh shucked oysters and clams and has not considered frozen products. Undoubtedly, the freezing and prolonged storage of shellfish produced abroad will have some effect on their apparent bacterial content.

In the United States and Canada, certain species of shellfish, notably clams and mussels, are sometimes subject to the accumulation of organic toxins. The origin and action of these toxins are fairly well understood, and a complex administrative control program is in operation to prevent toxic shellfish from being used commercially. Adequate test procedures are available and are being improved. However, there is some reason to believe that toxin which sometimes affects certain species of foreign shellfish may not be so well understood, and it is not certain that adequate tests have been developed.

Most of the frozen shellfish which would be shipped to the United States would be cooked before use. In fact, one importer has been investigating the feasibility of introduc-

ing clams which would be given some cooking before being frozen for shipment, this product being intended for use as chowder stock. It is unlikely that many frozen shellfish from abroad would be consumed raw. This factor is mentioned, not because there should be any significantly different standards applied to shellfish intended to be heat processed before sale but simply because the facts seem to indicate that any health hazard which might be present in connection with bacterial contamination of frozen shellfish from abroad would be considerably reduced by cooking. However, this expected heat treatment should not be employed in any way as a coverup for a filthy item. The Food and Drug Administration and the Public Health Service both hold this position.

There are in operation two parallel mechanisms of sanitary control for imported shellfish. One admits shellfish to this country, and, at the same time, the other restricts their market. Foreign governments find it difficult to understand that two different sources of legal authority in the United States, one Federal and one State, govern the importation and the marketing, respectively.

After a free exchange of views at the National Conference on Shellfish Sanitation, September 9 and 10, 1954, industry and government representatives agreed that recommendations on the significance of traffic in imported shellfish should come from the State Department. The State Department continues to study the developing trends of this commerce.

#### REFERENCE

- (1) Food, Drug, and Cosmetic No. 1, Revision 4; 21 U.S.C. 301 et seq.; 21 C.F.R. 1.1 et seq.

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## Shellfish Poisoning Episode In False Pass, Alaska

By H. F. MEYERS, B.S.,  
and D. K. HILLIARD, M.S.

A FATAL CASE of shellfish poisoning attributed to eating mussels that had fed on the dinoflagellate plankton, *Gonyaulax catenella*, was reported July 21, 1954, by the United States Commissioner at Dutch Harbor, Alaska. Since a survey of shellfish toxicity was being conducted in northern Alaskan waters at the time by the Public Health Service Arctic Health Research Center in Anchorage, the case was investigated thoroughly.

The poisoning occurred at a salmon cannery in False Pass on the northeastern end of Unimak Island in the Aleutian Chain. The following is an excerpt from the log of Dr. J. Clark, Alderwood Manor, Wash., physician at the cannery hospital, who gave invaluable assistance and cooperation at False Pass:

"Patient seen by physician at 4:45 p. m. and found suffering severe abdominal pain and nausea with vomiting. Man expired at 5:00 p. m. same date. Time of onset of illness between 2:00 p. m. and 4:45 p. m. All information gathered from fellow workers as man was unable to talk to physician. It is stated he was quite ill before calling for assistance. Symptoms when seen were those of poisoning and believed to have been caused by mussels."

Four days prior to the fatality, six other cannery workers consumed mussels from the same source. They reported to the hospital, however, at the first signs of illness, received gastric lavage and medications, and were released the next day.

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*Mr. Meyers, a chemist, and Mr. Hilliard, an aquatic biologist, are with the Public Health Service Arctic Health Research Center at Anchorage, Alaska.*

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The beaches at False Pass are primarily rock with some sand and gravel. The shoreline is irregular and has small coves which are undisturbed by the main current. These small coves are rich in various forms of algae and zooplankton, in addition to the usual debris and cannery waste. While the maximum difference between high and low tide is very small (2 feet) the current is extremely swift, changing direction with each change of tide. According to cannery workers, the current usually attains a velocity of from 5 to 7 knots.

Specimens of *Mytilus edulis* Linnaeus, the shellfish eaten by the cannery workers, were collected from several locations along the beach. While great numbers of the mussels were attached in clusters to rocks exposed at low tide, an even greater number were attached to the ocean floor and obviously not exposed during extreme tides. The mussels were extracted at the local cannery hospital, bottled, and retained for bioassay at the Arctic Health Research Center laboratory. Plankton samples were collected simultaneously and preserved in Transeau's solution for laboratory examination.

The extraction and bioassay were carried out according to currently accepted methods, that is, 100 gm. of mussel tissue were ground and mixed with 100 ml. of 0.1N hydrochloric acid. The mixture was refluxed for 5 minutes, rather than boiled in a beaker, so that it was unnecessary to bring the mixture back to the original volume. The pH was adjusted to 4.0-4.5, the mixture centrifuged, and the clear supernatant liquid withdrawn and preserved in sterile bottles. One ml. of this liquid, when injected intraperitoneally into a 19.8 gm. mouse, caused death in 48 seconds. Numerous dilutions were made, and a range of from 74,000 to 106,000 mouse units per 100 gm. of raw material was obtained. A mouse unit is the amount of poison contained in 1 ml., pH 4.0-4.5, that will kill a 20-gm. mouse in 15-20 minutes after intraperitoneal inoculation. It has been estimated by other workers that the minimum lethal dose for man is probably between 20,000 and 40,000 mouse units (1). On the basis of this evidence

False Pass (arrow) latitude  $54^{\circ}52' N.$ , longitude  $163^{\circ}24' W.$ , is the first break in the Alaska Peninsula allowing waters from the Bering Sea to come in contact with the Pacific Ocean.



the Arctic Health Research Center stated, for public information, that less than 4 ounces of raw material would produce lethal results.

Microscopic examination of the plankton samples obtained at False Pass indicated that the organism *Gonyaulax catenella* Whedon and Kofoid was present, but not in large numbers. Since travel in the Aleutian Chain is almost entirely by air and is dependent upon weather and fog conditions, 2 weeks had elapsed between the death reported and collection of samples. It is possible that the ideal conditions for growth of this organism no longer existed. It has been stated (2) that "The strong radiation of the sun together with the cold nutrient waters due to upwellings seem to be ideal for the growth of this dinoflagellate." The nutrition supplied by the cannery waste together with the cold waters of the Bering Sea coming in contact with the warm

waters of the Pacific in this small pass would more than fulfill these ideal conditions.

Future work is planned in connection with shellfish poisoning in the Aleutian Chain, particularly in the Kodiak area. Natives at False Pass, Kodiak, and at other points on the Aleutian Chain refer to individuals who in the past have become violently ill, with an occasional death, after eating shellfish. Since there was seldom a physician available, the stories could not be substantiated.

#### REFERENCES

- (1) Meyer, K. F.: Medical progress: Food poisoning. *New England J. Med.* 249: 843, Nov. 19, 1953.
- (2) Sommer, H., and Meyer, K. F.: *Mussel poisoning: Manual for the control of communicable diseases in California.* San Francisco, California State Department of Public Health, 1948.

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# The American Social Hygiene Association

By C. WALTER CLARKE, M.D.

TODAY, 40 years after the American Federation for Sex Hygiene and the American Vigilance Association merged to form the American Social Hygiene Association, the country recognizes that, although much has been accomplished in sex education, venereal disease control, and the suppression of prostitution, the problems the American Social Hygiene Association faced up to originally remain a challenge. Nor is it so remarkable that present social hygiene problems are in many ways identical to those of 1914. Problems rooted in human nature require generations of cooperative planning, research, demonstration, and field work for their solution. They do not lend themselves to the once-over-lightly treatment optimists would give. Instead, as one or another aspect of these problems has changed according to time or circumstances, emphases have changed to meet the need.

## Mobilizing Public Opinion

Dr. Charles W. Eliot, John D. Rockefeller, Jr., James Bronson Reynolds, Dr. William F. Snow, and others present at the first meeting

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*Dr. Clarke, executive director emeritus of the American Social Hygiene Association, has been a member of the association's staff since 1914 as field secretary, European representative, medical director, and executive director. He has served as clinical professor of public health practice, Harvard University, and has been associated with a number of State, national, and international health and welfare organizations. During World War II, Dr. Clarke was consultant to the Secretary of War.*

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of the new national association in 1914 did not minimize the difficulties before them. They knew there was as yet no public opinion to support their aims and that the channels through which public opinion can usually be molded were firmly closed to them. Public discussion of sex problems was taboo. On the credit side, however, they had the support of distinguished leaders who could eventually influence public opinion. Men and women like David Starr Jordan, Jane Addams, Grace Dodge, Cardinal Gibbons, Felix Warburg, and Julius Rosenwald had been attracted to the social hygiene movement by the work of the association's two parent organizations and especially by the work of Dr. Prince A. Morrow, president and founder of the American Federation for Sex Hygiene. Perhaps less effective was the support of the 12 "sex hygiene societies" and about an equal number of "vice commissions" in cities from coast to coast. Their feeble, fumbling attacks on the great problems of sex ignorance, sexual vice, and venereal disease did little to break down ignorance and complacency.

As it was, only a few individuals had the courage to participate in this unpopular movement. The earliest leaders were preponderantly physicians, whose professional training permitted them to discuss social hygiene without censure, and a few clergymen, businessmen, and educators. The new association set out to increase the number of such leaders, people who could influence public opinion and open channels to the public. Once the conspiracy of silence in the press, pulpit, classroom, and home was overcome, the American Social Hygiene Association could make progress in its efforts to help correct abominable conditions.

Although World War I was responsible for

removing some taboos—activities protecting the armed forces from prostitution and venereal diseases were publicized—it was not until 1936 that the channels to the public finally opened. First the *Chicago Tribune*, then the *New York Daily News* ran articles frankly discussing syphilis and gonorrhea. Other newspapers followed their lead, and soon the press from coast to coast was publishing popular scientific articles on the venereal diseases. ASHA provided much of the data for them. When weekly and monthly periodicals followed suit, the *Readers Digest* was in the vanguard with an article by Dr. Thomas Parran which had originally appeared in the *Survey Graphic*. To many venereologists, this widely read article by Dr. Parran was the key to much of the progress made over the next several years in venereal disease control. Not long afterward broadcasting stations yielded to pressure and admitted to the air “authorized” scripts dealing with syphilis. The conspiracy of silence was at last broken.

### Combating Venereal Disease

The great new medical discoveries relating to syphilis were still re-echoing in the scientific world in 1914 when the American Social Hygiene Association was launched. With laboratory methods of diagnosis and effective treatment at last available—tedious though the treatment was—the medical profession was encouraged to lead efforts to combat this disease. Though physicians had no satisfactory therapy for gonorrhea, they had diagnostic methods and could accomplish much as they waited for the day when effective treatment would be discovered. Strangely enough today, although the nearly perfect remedy has been found in penicillin, the conquest of gonorrhea has not advanced to the same extent as the conquest of syphilis.

The association early set itself the task of stimulating the organization of clinics and laboratory services, the formulation and enactment of laws to control venereal disease, and the establishment of education programs with trained personnel. But scarcely had ASHA started these activities when the Mexican border incident and World War I gave it an opportunity to work with other agencies directly

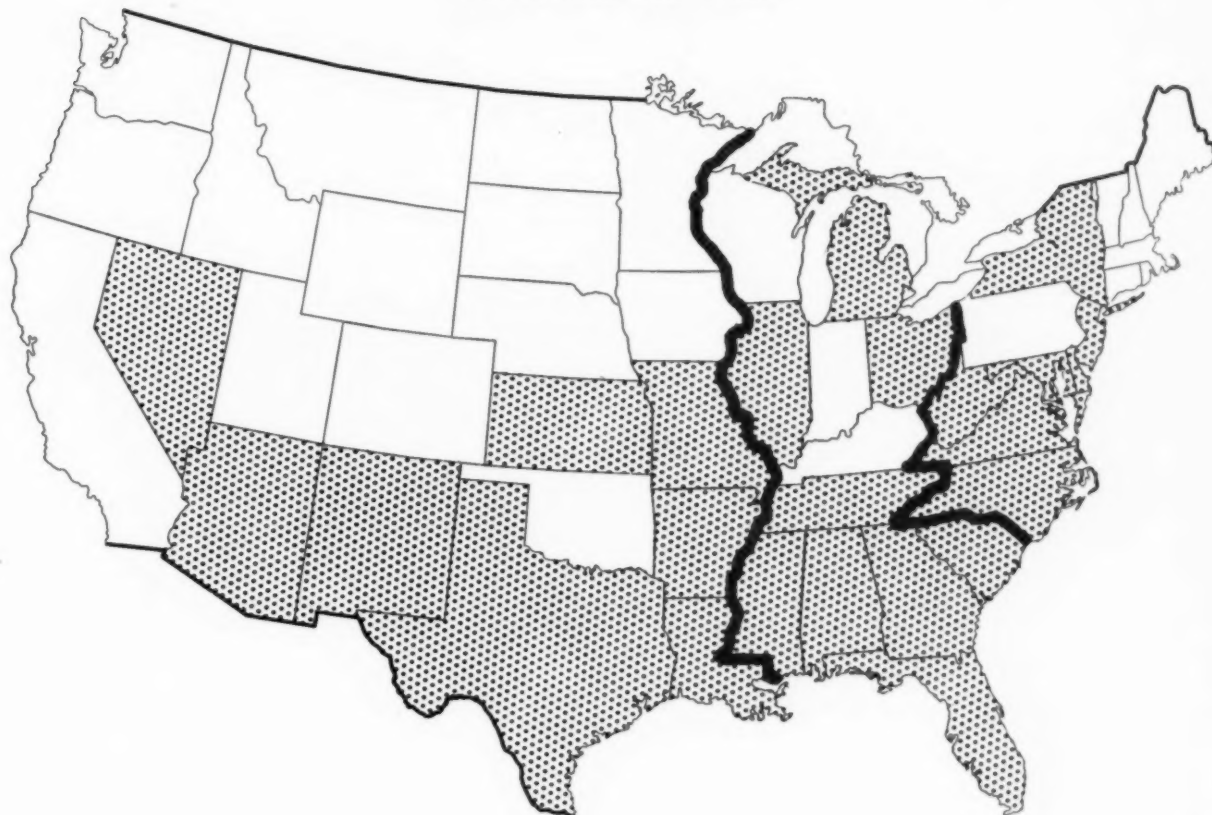
and to put to the test its medical and public health as well as its education and social policies. Under ordinary conditions of peace no such concerted action would have been possible.

Raymond B. Fosdick and Dr. Snow, speaking for the association, suggested to the Secretary of War a fourfold program: (a) provision of modern diagnosis and treatment and chemical prophylaxis to members of the armed forces, (b) vigorous repression of prostitution in the vicinity of training camps, (c) instruction of soldiers and sailors regarding the nature and prevention of venereal diseases, and (d) provision of wholesome recreation in and near all training centers.

The Secretary of War, who had successfully repressed prostitution when he was mayor of Cleveland, and the Secretary of the Navy both welcomed the association's offer of assistance and accepted these proposals. Virtually all the association's professional staff were commissioned in the Army or Navy and were assigned to venereal disease control work. With other quickly recruited and trained professional men they carried out their military assignments with vigor in the United States and abroad.

In addition to providing key personnel to the Army and Navy, the American Social Hygiene Association conducted studies of prostitution conditions around training camps, assisted State and local officials in law enforcement, provided pamphlets, posters, exhibits, and films for the venereal disease education program in the Army and Navy, and assisted in training new personnel (1). Despite the fact that this was a new venture, results were highly satisfactory. During World War I venereal disease rates, which had been rising during the prewar years, fell again and at war's end were almost as low as they had been at any time previously (2). A large body of young men in the armed forces had learned simple facts about the venereal diseases. The ASHA and other national agencies—the American Red Cross, Playground and Recreation Association of America, Young Men's Christian Association, and General Federation of Women's Clubs, to name a few—in their efforts to improve the environment near military establishments dealt prostitution a blow from which it never fully recovered.

States with early syphilis above the maintenance control level of 20 cases a year per 100,000 population, fiscal year 1953.



Nevada .....	28.7	Michigan .....	24.5	New York .....	26.0
Arizona .....	115.8	Ohio .....	32.4	New Jersey .....	24.8
New Mexico .....	26.8	Illinois .....	22.0	Delaware .....	43.0
Kansas .....	29.7	Tennessee .....	41.8	Maryland .....	27.1
Texas .....	30.3	Mississippi .....	30.7	District of Columbia .....	113.1
Missouri .....	22.5	Alabama .....	27.4	West Virginia .....	30.1
Arkansas .....	36.4	Florida .....	133.4	Virginia .....	57.7
Louisiana .....	56.7	Georgia .....	41.7	North Carolina .....	41.6
		South Carolina .....	80.8		

### Between the Wars

Early in 1918 ASHA supported a bill providing for (a) the establishment of a Division of Venereal Diseases in the Public Health Service, (b) the appropriation of funds for this division and through it to the State health authorities for venereal disease control activities, and (c) the establishment of an Interdepartmental Social Hygiene Board to coordinate and encourage the activities of all Federal agencies interested in social hygiene. This bill, passed by Congress as the Chamberlain-Kahn Act with an appropriation of \$4,100,000 for fiscal years 1919 and 1920, enabled Federal and

State governments to launch venereal disease control programs along lines considered sound at that time. But at that time public knowledge of the hazards of the venereal diseases was much less complete than it is today, and public support for the program was not forthcoming. As a result, the auspicious beginnings came to a halt. We have learned since then that only by continued interest, supported by adequate funds, can we stamp out venereal diseases.

In the period between the two World Wars, ASHA urged State and local health authorities to establish sound permanent venereal disease controls, conducted studies of syphilis preva-



lence, made censuses of venereal disease cases under private and clinic treatment, evaluated the venereal disease control programs of cities and counties and suggested improvements, drafted and successfully urged the adoption of the first prenatal examination law and an improved premarital examination law, and published digests of laws dealing with the venereal diseases, prostitution, and related offenses. Through the League of Nations, League of Red Cross Societies, and International Union Against the Venereal Diseases, the association aided international health and social welfare programs, especially those aimed at suppressing traffic for immoral purposes in women and children. From 1935 to 1938 an officer of the ASHA organized a venereal disease control program for New York City, one of the most complete at that time.

A joint committee of the American Pharmaceutical Association and the ASHA, formed in 1939, has stimulated cooperation between the two groups in informing the public about the dangers of quacks and nostrums and in stressing the fact that only members of the medical profession can give adequate treatment for venereal diseases.

In 1920 ASHA began to build public opinion toward a new national effort. This was a long process. Not until 1937 was the time ripe to ask Congress for new Federal legislation based on recommendations of the Conference of State and Provincial Health Authorities, American Social Hygiene Association, and other agencies, after careful studies by the Public Health Service and State health authorities. The LaFollette-Bulwinkle bill, passed in 1938 without opposition, authorized the appropriation of \$3 million to start venereal disease control operations. As the program developed, appropriations were increased. With the Federal Government at the helm of the control program, it was not long before State and Territorial health departments were using new and highly effective control techniques in an integrated attack against venereal disease. The importance of Federal leadership was proved at this time. By the time the United States entered World War II, medical and health authorities were reasonably well provided with facilities

and personnel to cope with an anticipated rise in incidence of syphilis and gonorrhea resulting from disturbed social conditions during and following the war.

## World War II

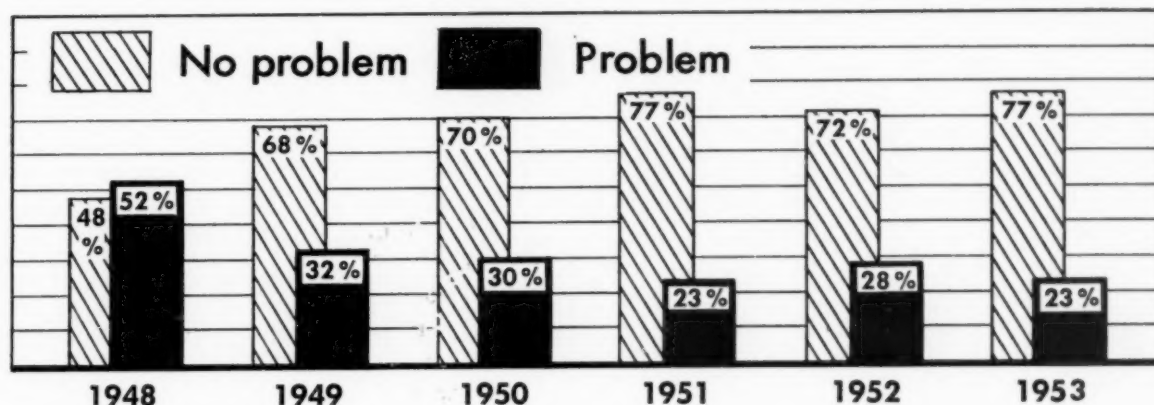
In September 1939, when President Roosevelt declared a "limited emergency" the American Social Hygiene Association immediately turned all its resources to activities in support of the defense effort. In 1940 the War and Navy Departments pledged in an 8-point agreement to control venereal disease near concentrations of the armed forces or defense workers, and they agreed to cooperate with police authorities in repressing prostitution. The American Social Hygiene Association and State and local social hygiene groups set out to stimulate public support.

After mobilization began, on the basis of the association's suggested legislation, Congress passed the May Act, which gave the Army and Navy authority to cope with prostitution conditions near training centers. At the association's suggestion, the Federal Security Agency created the Social Protection Division to cooperate with State and local officials in maintaining a wholesome environment near training centers, and the Federal Security Administrator established an Interdepartmental Venereal Disease Committee to facilitate cooperation between the Federal Security Agency and the Army, Navy, and American Social Hygiene Association.

As a member of a team seeking to protect the armed forces from prostitution and venereal disease, the association provided up-to-date facts about prostitution conditions near military installations; encouraged civilian support of the official health and welfare program for protecting the armed forces and defense workers; participated in training personnel for venereal disease control activities; and helped provide the Army and Navy with educational materials. An officer of the association served as consultant on venereal disease control to the Secretary of War and as a member of the National Research Council's committee supervising experiments in penicillin therapy for syphilis and gonorrhea.



# Existence of prostitution in representative cities in the United States and Territories, 1948-53.



As a result of all these official and voluntary activities, the venereal diseases were kept under control to a greater extent than during any other war in our history (3).

Character guidance and education programs in the armed forces, plus widespread cooperation among government, military, and community agencies, also had a beneficial effect in decreasing prostitution. In 1942 the association's survey of prostitution showed an improvement in conditions. Civilians in communities which had long tolerated prostitution had had to reverse their thinking when the May Act declared prostitution a menace to the health and welfare of service personnel. More and more, people came to regard it as a social evil that weakened all law enforcement, exploited young people, and endangered the health and welfare of all. In its efforts to keep communities wholesome, the association had the support of such agencies as the Federal Bureau of Investigation; American Bar Association, which appointed a Committee on Courts and Social Protection to help control vice; National Police Committee on Social Protection, which developed new techniques of law enforcement in repressing prostitution; National Sheriffs' Association and International Association of Police Chiefs, which adopted resolutions condemning toleration of prostitution; General Federation of Women's Clubs; and Federal Council of Churches.

In 1944 with the establishment of Joint Army-Navy Disciplinary Control Boards (which now encompass all the services), ASHA and other interested civilian groups sent their

representatives to board meetings as advisers requested by the military. ASHA's special contribution was to advise on civilian education and repression of prostitution and to supply the facts on prostitution conditions near military establishments.

## Postwar Period

In 1946 and 1947 venereal disease rates at first rose to a high point and then began to fall as penicillin became more widely used, as vigorous venereal disease case finding and contact tracing and activities repressing prostitution were instituted, and as social conditions became more stable. After the discontinuance of the Federal Social Protection Division, the association reestablished its Washington liaison office and its field offices across the country. (This expansion was financed by the United Service Organizations and later by the United Defense Fund.) When mobilization began in 1948, the military asked ASHA to pay special attention to communities near military camps in surveying prostitution conditions. The association also responded to requests for millions of pamphlets warning young servicemen about the dangers of venereal disease and other menaces to their health or morale. These services the association is still providing.

Like other interested organizations, the American Social Hygiene Association has considerable appreciation of the great accomplishments in venereal disease control during the last several years. ASHA is encouraged about the prospects of ultimate control of these dis-

eases, but it does not share the extreme optimism of some medical and public health leaders who appear convinced that the menace of the venereal diseases is at an end. Its analysis of the present situation—in cooperation with the American Venereal Disease Association and the Association of State and Territorial Health Officers—fortifies the association's opinion that more money is needed to deal adequately with the size and complexity of the control problem in many areas of the United States and that allocations should reflect local needs.

The American Social Hygiene Association believes that although there may be some shifts in emphasis, the future program for venereal disease control requires no new approaches. Despite satisfactory conditions in some areas, there are many scattered pockets of high prevalence. It is the association's opinion that the control program for the next several years should (a) emphasize the pockets of high incidence and prevalence, (b) intensify case finding in some areas, (c) place greater emphasis on the latent aspects of syphilis, and (d) concentrate greater effort against gonorrhea. The lessons of the past revealed in the adverse effects of undue complacency should be remembered.

### Education

In its early days the American Social Hygiene Association realized that before it could institute an education program it had to develop a philosophy about the role of sex in human life. Only then would its leaders have a basis for making decisions about materials and methods which could best encourage ideas, attitudes, and habits that strengthen family life. The early leaders—notably Professor M. A. Bigelow, Professor T. M. Balliet, and Professor Thomas W. Galloway, as well as Dr. Morrow and Dr. Eliot—believed sex instruction should be dignified, inoffensive, and consistent with American mores. From the start ASHA's program stressed the training of teachers and leaders, and its first educational efforts were directed toward colleges and universities. Then, as today, it sought also to reach the parents—the child's first instructors—through PTA's, women's clubs, and churches. Radio and television programs and newspaper and magazine articles

prepared under ASHA's aegis, as well as its own publications, now reach those parents in their homes where they were once almost unreachable.

Where there once was a tendency to make sex education a phase of general health education, today the trend is toward using new social and psychological data and skills to make sex education a facet of family life education, of which it is clearly an important part. In line with this trend and with the need for preparing young people for almost certain induction into the armed forces, ASHA worked with State and city departments of education and the military in preparing a booklet entitled, "Preinduction Health and Human Relations." This resource for teachers and youth leaders stresses that the maximum development of youth can be furthered rather than retarded by the opportunity to serve the Nation in the armed forces.

Recently, the association has inaugurated a 10-year plan of regional projects enabling 3 or 4 States to work together to meet the need for preservice and inservice education for teachers on problems of personal and family living. The pilot project, already in progress in four mid-west States, is under the direction of a committee composed of college and university administrators and representatives of national educational organizations.

Realizing that the scope of education is broadening each year, ASHA's staff participates with other educational groups at meetings and institutes to avoid duplication of effort and to understand better the interrelationships of various agencies with interlocking problems. Among them are the National Conference of Elementary School Principals; American Association of School Administrators; American Society for Curriculum Development; National Rural Health Conference; National Conference on Cooperation in Health Education; American Association of Health, Physical Education, and Recreation; American Public Health Association; and the Fourth National Conference on Health in Colleges.

Recent projects in which the association served the armed forces include an on-the-spot study for the Air Force of environmental conditions affecting the health and moral welfare of American airmen in the Far East and three

demonstrations of civilian-military cooperation on behalf of service personnel: (a) a lecture series on family life cosponsored by the faculty and YWCA of the University of Illinois and the Character Guidance Council of Chanute Air Force Base, Rantoul, Ill.; (b) a similar lecture series for Wacs at the Army Finance Center, Fort Benjamin Harrison, Indianapolis, cosponsored by the Indianapolis Social Hygiene Association; and (c) educational services for Wafs (and later for airmen) of the 1020th Special Activities Wing of the Air Force at Arlington Farms, Va., under the aegis of a committee of Washington, D. C., leaders.

In 1953 ASHA's representatives visited 330 different communities to speak at meetings and conferences, to assist local social hygiene groups, to study prostitution conditions, and to work with local officials to remedy unwholesome influences, and to conduct institutes on family life education.

#### International Activities

ASHA is the United States member agency of the International Union Against the Venereal Diseases and the Treponematoses, which works closely with the United Nations and other international agencies interested in venereal disease control and the suppression of prostitution. ASHA's international division also serves as the international union's regional office for the Americas. In 1953, two physicians, both members of ASHA's advisory committee on international services, attended meetings of the IUVDT in Rotterdam. One also participated in a conference in Geneva with representatives of the World Health Organization, IUVDT, and the League of Red Cross Societies. As funds become available, the

international union's regional office for the Americas hopes to expand its present services to the countries of Central and South America, and has planned an Inter-American Conference on Venereal Disease and several smaller conferences.

Other examples of ASHA's international services are: (a) providing Japan with information on effective methods of controlling prostitution and venereal disease near military installations; (b) sending publications to India for a health exhibit; (c) giving guidance to Peru on setting up a program on sex education; and (d) evaluating venereal disease and prostitution regulations in Ceylon.

Operating on a broad front, the American Social Hygiene Association looks to cooperation with a variety of institutions and agencies for an effective, economical pooling of special skills. There is room for tried techniques as well as new tools and fresh combinations of both; there is need for flexibility, initiative, and perseverance. Equipped with these, the American Social Hygiene Association is working to strengthen family life and to stamp out old evils so that our people within their homes may grow in understanding and health, fortified by the supports of a wholesome community.

#### REFERENCES

- (1) Moore, J. E.: An evaluation of public health measures for the control of syphilis. *Am. J. Syph., Gonorr., and Ven. Dis.* 35: 101 (1951).
- (2) Siler, J. F.: The prevention and control of venereal diseases in the Army of the United States of America. *Army M. Bull.* No. 67. Special issue. May 1943.
- (3) Hinrichsen, J.: Venereal disease in major armies and navies of the world. *Am. J. Syph., Gonorr., and Ven. Dis.* 28: 736 (1944); 29: 80 (1945).

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# A Special Purpose Health Education Program: Breast Self-Examination

By RAYMOND F. KAISER, M.D.

OVER FOUR YEARS of experience with a public education program designed to establish breast self-examination as a health practice among women indicate that the program is and will continue to be definitely worthwhile in promoting the early detection of breast cancer. This is said with the realization that a full assessment of its value is not yet, and may never be, possible. It is known, however, that public reception of the program has been uniformly favorable, that the program has reached directly some 7 million women, and that evaluation studies have shown encouraging results.

The program, a joint activity of the National Cancer Institute of the Public Health Service and the American Cancer Society, was initiated for the purpose of alerting the public to the problem of breast cancer, its extent, and the possibility of control, with the ultimate objective of reducing mortality from this disease. Although it is recognized that the possibility of using self-examination does not exist in all health fields, it is believed that certain of the educational means used in this program, such as the "saturation" techniques, may be found applicable to other public health problems.

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*Dr. Kaiser is chief of the Field Investigations and Demonstrations Branch, National Cancer Institute, Public Health Service. This paper is based on his address to the Sixth International Cancer Conference held in São Paulo, Brazil, July 23-29, 1954.*

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## The Problem and the Approach

The prevalence of breast cancer is a matter of grave concern in the United States. It is the second most common form of malignant disease among women. Statistical studies indicate that, according to present rates, 4 percent of all women who reach the age of 35 years will die of this disease. Although it occurs in an organ readily accessible to direct examination, only 2 of every 5 cases are diagnosed while the growth is localized. Nearly 19,000 women died of breast cancer in this country in 1950, many of them perhaps needlessly. Since there is a correlation between the time of onset of the disease and, to some extent, the size of the growth and the final prognosis, a program of public education to establish a health habit contributing to early diagnosis was strongly indicated.

The program was conceived as having the double objective of emphasizing the value of periodic examination of the breasts as a routine health habit and of demonstrating a medically approved, easily applied procedure for self-examination of the breasts.

The motion picture was selected as the principal medium for the educational project since it would insure uniform presentation of technically accurate information. It was supplemented by printed materials containing diagrams and directions for the approved examination procedure and information about the film. These materials are made available for distribution in connection with showings of the film, and additional information is provided through talks by physicians and nurses.

## Production of Materials

Production of the motion picture, *Breast Self-Examination*, was authorized by the National Cancer Institute and the American Cancer Society in 1949, each agency financing half the total cost. The film was designed to portray a situation in which nonprofessional groups



could have a role in cancer control, and, at the same time, to instruct the individual woman in the proper examination procedure. Care was taken to avoid presenting any of the material in a manner which would cause an adverse reaction or produce cancerophobia.

The film shows an actual demonstration of the breast self-examination procedure to a patient by her physician, followed by scenes in which the woman is carrying out self-examination according to his instructions. A practicing physician assumed the role of the physician in the film and also acted as one of the technical consultants in the production of the picture.

The film emphasizes the importance of this health practice to the control of breast cancer. In the story, the patient is first seen at a woman's club listening to a physician lecture on cancer of the breast. The gravity of the breast cancer situation and the importance of early diagnosis are brought out. It is emphasized that any abnormalities discovered through self-examination should be referred immediately to a physician. Women are advised not to think of cancer too much or examine themselves too frequently, but to be alert to the problem.

#### **Distribution of the Materials**

The film had its premiere before the Nurses' Biennial Convention in San Francisco in May 1950. About the same time, it was shown in Paris during the Fifth International Cancer Congress. The first general viewing by the medical profession in the United States was at the annual convention of the American Medical Association in San Francisco in June 1950, where it played to a "standing room only" audience.

Meanwhile, State health departments, State divisions of the American Cancer Society, medical and nurses organizations, schools of nursing and national women's organizations were supplied with the informational materials on breast self-examination which supplement the film.

During the summer of 1950, showings of the film were arranged, first, for employees of the Federal Government, beginning with those of the National Institutes of Health and others in the Department of Health, Education, and

Welfare (then the Federal Security Agency) and, later, for similar employee groups in the health departments of the States. Selected leaders of women's organizations, such as the General Federation of Women's Clubs, which is listed as representing some 6,000,000 women, had a special preview. By October 1950, Breast Self-Examination had been distributed to all State and Territorial health departments from Maine to Hawaii, to large professional groups such as the American Public Health Association, and to staffs of colleges and universities throughout the United States.

The film was released for general showings in the autumn of 1950. Veteran's organizations, large industrial plants—the Owens-Illinois Glass Company and Douglas Aircraft, for example—student groups, women's clubs, and women's farm organizations were enlisted in the effort to give Breast Self-Examination the widest possible use. After its Paris preview, it was shown outside the United States at film festivals in Venice and Gardone, Italy, throughout sections of Germany, at the film festival in Montevideo, Uruguay, and in such an isolated spot as a lonely airbase in Newfoundland. The United States Department of State placed prints of the film in 30 embassies in Europe, the Near East, the Orient, and Latin America. Through the United Nations Educational, Scientific, and Cultural Organization and the United States Foreign Operations Administration and its predecessor agencies the film has been shown in areas as remote as the island republic of Indonesia. A team of scientists with the World Health Organization showed the picture in the cities of New Delhi, Madras, and Bombay, India.

At all meetings where the picture is shown, physicians, nurses, or other well-informed persons discuss the subject of breast cancer and answer questions from the audience. Records of such questions have been kept, and they have proved to be valuable indexes of the level of information about breast cancer and cancer in general in the populations represented.

The publicity which the film has received, in magazines of national circulation, in special publications such as *Public Relations News* and *Business Screen Magazine*, and in metropolitan newspapers, has been uniformly favor-

able. Communications from organizations which have seen special showings of the film have been equally commendatory. The photography, narration, and presentation have been judged outstanding—clear enough to be understood by lay audiences but still interesting to physicians (1).

### The Iowa "Saturation" Project

Constituting a new approach to this kind of educational effort was the project in Iowa in which the entire State was "saturated" with showings of Breast Self-Examination. Participating in the project were the National Cancer Institute, which allocated funds in the amount of \$20,000, the Iowa State Department of Health, the Iowa division of the American Cancer Society, the Iowa Medical Society, and practicing physicians in the area. Dr. Edmund G. Zimmerer, then director of the division of cancer control, Iowa State Department of Health, and now Iowa State commissioner of health, headed the program.

Iowa is largely rural, but it has a number of fairly large cities and many small towns. Except for the large cities, the campaign was organized by counties. In the larger communities, it was often necessary to have several simultaneous showings. The American Cancer Society assisted in scheduling meetings where Breast Self-Examination could be shown.

The 1950 census for Iowa indicated that, out of a total population of 2,600,000, there were 590,000 women in the State over 35 years of age and 300,000 over 45 years of age. Since breast cancer is most prevalent in women over 45, the figure 300,000 was set as the goal to reach in the film showings.

"A life a day saved" became a slogan for the project. It was based on the premise that it should be possible to save 360, or 90 percent, of the 400 victims of breast cancer in Iowa annually, or approximately 1 each day of the year, since it is generally accepted that this percentage of breast cancer patients can be saved if the cancers are found and treated early enough.

The project was under way by early autumn of 1951. In the large cities, business firms became enthusiastic in their cooperation. The

Meredith Publishing Co. in Des Moines arranged for 17 showings of the film. The city papers, the *Register* and the *Tribune*, combined their staffs for a showing. County fairs booked Breast Self-Examination as a major attraction. The Iowa State fair showed the picture every hour each day for 10 days. This fair, one of the largest livestock and agricultural shows of the country, draws people not only from the State but also from a large surrounding territory.

For almost 2 years the film was shown in Iowa. When snows blocked the roads in the winter of 1951, women rode farm tractors to schoolhouses and halls to see it. The executive director of the Iowa division of the American Cancer Society appraised the project as the greatest educational program ever experienced in the field.

A total of 289,000 women saw the film—96 percent of the 300,000 goal, or 49 percent of the total female population over 35 years of age in the State of Iowa. Forty-eight percent of them were 45 years of age or older.

About a year after the showings, an evaluation of the Iowa project was made (2). Questionnaires were sent to a sample 3,000 women who had voluntarily registered. Over 1,300 replied, representing 13.6 of every 10,000 women in the State over 35 years of age. The proportion of women between 35 and 54 in the sample was larger than the proportion in the general population; hence, the percent at risk was somewhat greater. Eighty percent of the sample group responding were housewives, and the same percentage were married. Twenty percent lived in the city; 40 percent, in smaller towns; and 40 percent, in the country.

Ninety-two percent of the 1,300 women stated that they had examined their breasts as a result of seeing the film, 47 percent stating further that they had continued the practice. Nine percent said they had detected some abnormality, and in this group seven cancers were found. When the women were asked if they thought this educational program, and especially the film, worthwhile, 94 percent replied in the affirmative and only 0.4 percent in the negative. The others failed to respond.

These answers are evidence that the film succeeded in projecting its two basic ideas: the

establishment of breast self-examination as a health habit and the teaching of a simple technique for self-examination.

### Two Evaluation Studies

Another evaluation of the film was made by members of the staff of the Yale School of Public Health in cooperation with the local cancer society in 1952 (3). For this study, a sample of 600 women in New Haven, Conn., a city of 250,000, was selected. The investigators were interested in who saw the film, what they learned, what they did as a result of learning, and how the film contributed to case finding. Of the 600 women, 547 agreed to answer a questionnaire and 225 actually did so. Admittedly, the people selected were women usually approached on civic problems, and the group was heavily weighted in favor of the higher economic and cultural levels.

Eighty-six percent of the 225 women who replied were married. Seventy-seven percent stated that they had practiced breast self-examination at least once, and 60 percent reported that they did it as a regular health habit. The results in case finding were not conclusive, since for each 5-year period since 1940, the number of patients with breast cancer coming to hospitals in New Haven while the growth was still localized had increased. Although this might be interpreted as indicating a trend toward earlier detection, the fact remains that 77 percent learned the technique of breast self-examination, and 60 percent established the practice as a regular habit after seeing the film.

A similar study was undertaken by a group of physicians in Baltimore, Md. (4). Approximately 6 months after a series of showings of the film in that city in 1952, interviews were conducted with nearly 2,400 women who had seen the picture and participated in the ensuing discussion with the attending physician. The composition of this group as to color and age was approximately the same as that of the adult female population of the city. The women were employees of the several divisions of the Federal Security Agency located in Baltimore. Five trained women interrogators were used in the project, and careful internal checks of one

answer against another measured the validity of the replies.

The answers given by these women indicated that only 7.8 percent examined their breasts before seeing the film, whereas 80.7 percent, or 1,900 of the 2,400, had done so occasionally or frequently since seeing it; 33 percent of these 1,900 women practiced breast self-examination monthly as recommended. Married women, nonwhite women, and women with the highest educational attainments responded best to this educational technique. Women who had a previous history of breast disease were less responsive. Acceptance of the principles and practice of self-examination was highest in early adult life and lowest in later life. The importance of early detection and the method of examination were rated by the group as the most valuable lessons. Only 6 percent of the women said they had learned little or nothing from the film. Three percent discovered abnormalities through self-examination, and 24 percent consulted their physicians after seeing the film. Only 110 of the 2,400 had had breast operations prior to seeing the picture, but within 6 months after seeing it, 15 were deemed by their physicians to have conditions warranting surgery. Fortunately, most of these women were found to have benign tumors. Three cancers of the breast were discovered, an incidence three times greater than expected for a group of this size over this period.

The conclusion of the investigators was that the showing of the film with the associated physician-audience discussion was an effective method of teaching the public the principles of early detection of breast cancer by self-examination.

### Conclusion

It is too early to evaluate the case-finding possibilities of this program to promote breast self-examination as a health habit among women. The evaluation studies which have been made, limited though they are, indicate, however, that a number of women who have seen the film and participated in the discussions following its showing are practicing breast self-examination.



Over 7 million women have seen the film in the past 4½ years, four times as many people as have seen any other health film; and, in what seems to be an upswing of interest during the last year and a half, 1½ million women saw it in 1953. The total influence upon these people and upon others with whom they may associate, of course, can never be calculated. In the certainty that Breast Self-Examination can profoundly effect efforts toward the successful control of breast cancer, this educational material will continue to be offered to the women of this and other countries.

#### REFERENCES

- (1) Medical motion pictures. Breast self-examination. *J. A. M. A.* 143: 673 (1950).
- (2) Iowa State Health Department. Division of Cancer Control: Can a movie establish a new health habit? A report on presenting the film breast self-examination to women in Iowa. Des Moines, Iowa, 1954.
- (3) Cohart, E. M., and Hill, J. K.: Evaluation of the breast self-examination film. *Am. J. Pub. Health* 42: 430-436 (1952).
- (4) Lewison, E. F., Jones, H. W., Jr., Doran, W. T., Jr., and Mandel, B. J.: Breast self-examination: Educational and clinical effectiveness of the film. *Maryland State M. J.* 3: 1-3, 130 (1954).

## idea

### *Helicopter Ambulance Service*

**BUFFALO, N. Y.** Kenmore Mercy Hospital in Kenmore, N. Y., a suburb of Buffalo, is one of the two hospitals in the United States that now has helicopter emergency ambulance service. A temporary heliport, a 20-foot square wooden platform, has been constructed a few feet from the emergency entrance to the hospital, and a helicopter is on call any time of the day or night.

The service was instituted last fall with an offer by the Bell Aircraft Corporation to make available one of its helicopters for use in rushing critically sick or injured patients to the hospital. Physicians in this highly industrialized area of approximately a million people estimate that the helicopter will be used for at least 8 to 10 patients annually—perhaps a stricken sailor aboard a lake freighter miles from port, or an expectant mother in a remote, snowbound farmhouse, or a wounded hunter along a wooded trail.

A call to the hospital or the corporation for the service is immediately referred to the company physician, who dispatches the helicopter if conditions warrant its use. All the company's medical personnel



**A trial run with an "accident victim" officially opened the new heliport at Kenmore Mercy Hospital. Note that even before the helicopter's rotor blade stopped turning, the top was lifted from the helicopter litter.**

and guards have been given instruction on the handling of litters.

Used extensively during the Korean conflict to evacuate injured fighting men and civilians, the helicopter has proved its usefulness in removing injured persons from areas inaccessible to other forms of vehicular transportation. During floods in Holland, avalanches in the Alps, and earthquakes in the Ionian Islands off the coast of Greece, rotorcraft performed formidable rescue feats.

Helicopter ambulance service was first established in the United States

at a hospital in Santa Monica, Calif. Here a rooftop platform serves as a landing area, and helicopters are made available by rotorcraft firms in the Los Angeles area. Arrangements are now being made for the construction of a heliport in the Dallas-Fort Worth area.

It is not practical from an expense standpoint for a hospital to maintain and operate a helicopter. It might be practical, however, for local governments to own rotorcraft since they could be used to augment the services of a number of municipal agencies.